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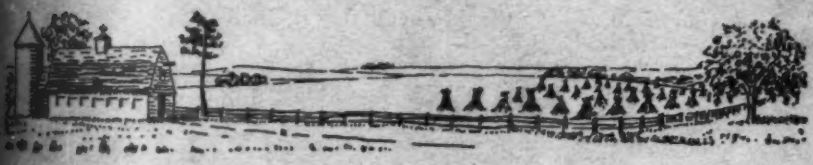

The Farmer's Digest

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Manure Pit Saves Valuable Nitrogen

Condensed from The Ohio Farmer

WITH nitrogen fertilizer unavailable for many crops and transportation becoming more difficult in the delivery of others, Ohio farmers will find the proper care of farm manure increasingly important and profitable. All too often, much of the valuable plant food in manure is allowed to waste away and never reaches cropland where it may assist in holding yields at a profitable level.

Just how great are the returns to be obtained from an application of manure are indicated by results at the Ohio Experiment Station where, over a 30-year period, five tons of manure annually, applied to crops grown in continuous cultivation, have produced average increases of: corn, 21.7 bushels; oats, 15.1 bushels; and wheat, 11.1 bushels.

Where manure was reenforced with phosphate fertilizers, results have been highly satisfactory in a general cropping program. In an experiment at the Ohio Station, where the addition of 320 pounds of a 16 percent superphosphate as a supplement to eight tons of stall manure applied to corn in a corn, wheat, clover rotation has produced 36-year average increases of corn, 10.3 bushels; wheat, six bushels; and clover, 840 pounds; a return of about $16.38 for an investment of about $3.20 in phosphate.

Unfortunately, even tho manure is recognized as a valuable form of fertilizer, a good share of its value is lost before it ever reaches the field. Much of this occurs as a result of storing manure near the barn in open piles for periods from a few days to several months. During this time leaching takes a heavy toll of all three main fertilizing elements—nitrogen, phosphoric acid and potash—as well as some of the organic matter.

According to one study at the Ohio Experiment Station, manure stored in an open yard for three months lost 39 percent of the organic matter, 30 percent of the nitrogen, 24 percent of the phos-

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phoric acid and 59 percent of the potash. Thus, in only three months, a good third of the value of this manure was lost.

To prevent such losses and to insure that a large part of the possible returns from manure are realized, some type of a storage shed will soon pay for itself. Salter and Schollenberger in a bulletin of the Ohio Experiment Station point out that "storing manure under cover, preferably in a closed shed, is the most practical method of preventing these losses. An ideal arrangement is a shed or pit with concrete floor connected to the barn by a shelter under which the manure spreader can stand, and so located with respect to the stable that the manure can be moved in a trolley carrier and dumped either into the spreader or shed."

The following table prepared by the Portland Cement Association suggests a desirable size for the manure pit for various numbers of dairy cows:

Manure Pits for Dairy Herds of Various Sizes

No. of Cows	Length	Width	Average Depth
10	16 ft.	16 ft.	4 ft.
18	24 ft.	18 ft.	4 ft.
20	26 ft.	18 ft.	4 ft.
30	30 ft.	24 ft.	4 ft.
40	40 ft.	24 ft.	4 ft.

Creep Feed for Early Weaning

Most economical pork is made on pigs during the suckling period. Arrange a "creep" or pen where pigs may enter, but where sows are excluded. If fall litters are to be grown, the spring suckling period may be shortened through such creep feeding or grains and supplements. Start creep feeding early. Place cracked or ground corn in a trough or feeder, and feed skimmilk, buttermilk or whey in another trough. Small pigs will take what is needed to make efficient gains. Oats or barley used in place of corn should be ground fine, and fed in same manner. Slop feeding during suckling period has no advantage. —*Hog Breeder*

Use Legumes in Seeding Mixtures!

Condensed from American Agriculturist

George H. Serviss

THE munitions depot of northeastern agriculture is its grasslands. Without this immense grassland reservoir northeastern farmers would have no chance of producing their part of the food needed for the war effort. With it they need not ask for odds from any group of farmers.

An enormous quantity of nitrogen is stored in this grassland reservoir and the ability to fix much more rests in the legumes that constitute part of it. Each year some grassland is plowed and each year about an equal amount of cropland is seeded back to grass. When such land is plowed and cultivated the nitrogen locked in the sod is made available for such crops as corn, wheat, rye, oats, or beans.

Valuable as our grasslands are they are still not as good as they can be. Legumes, especially perennial legumes, are the chief answer to the improvement of our grasslands whether they are utilized for hay or for pasture. Legumes make high protein feed and so long as they are present in abundance the need for nitrogenous fertilizers is greatly reduced, if not eliminated. Legumes need lime, phosphorus, and potash to grow well, and usually at least one, and frequently all three, of these minerals must be applied to northeastern soils.

Raising the fertility level of our pasture land often brings about a substantial increase in wild white clover which in turn results in a marked increase in carrying capacity. Legume seed, though, must be used on much of our pasture land before we capitalize fully on the lime and fertilizer applied. Legume seed should always be used in hay seedings, for hay legumes seldom come in spontaneously with fertilization.

In making hay and pasture seedings this spring, farmers are going to be concerned with the following points:

1. Yield
2. Protein content of feed
3. Duration of stand
4. Soil improvement (value when plowed under).

Most of the soil in the northeast is better adapted to the growing of legume grass mixtures rather than straight grass hay or pasture. Mixed hay or pasture is usually considered superior to

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straight grass and equal if not superior to straight legume.

In studying the make up of hay and pasture mixtures recommended by the various northeastern agricultural colleges some differences will be noted. These are chiefly differences in rates and the amount of emphasis placed on the different crops. Agronomists try to fit their recommendations to local conditions.

Seeding mixtures for one to two years of hay only, offer no particular problem. In these, main reliance is placed on medium red clover, mammoth red clover, alsike clover and timothy.

This year, however, most of the mixture seeded should be of the type that will yield well for three or more years without heavy fertilization with nitrogen. In all of such mixtures include one or more long-lived perennial legumes. In hay mixtures, alfalfa or Ladino clover or both may be used and in pasture mixtures, Ladino clover or wild white clover.

These perennial legumes will keep a meadow or pasture productive for as long as they persist, furnish high protein forage, and make good sods for plowing under. No long-term seeding should go out that does not contain a suitable perennial legume this year.

More hay mixtures should contain alfalfa than is now the case. The exact amount used is not so important as that some be used. Generally 4 to 6 pounds of alfalfa to the acre in combination with 4 to 6 pounds of red and alsike clover and 6 to 8 pounds of timothy give excellent results. More alfalfa should usually be used if the soil is such that red and alsike clover need not be included in the mixture.

Much of the land seeded to hay in the northeast this spring will not be well suited to alfalfa. On this land one pound of Ladino clover seed should be used in place of alfalfa. If Ladino clover is the only legume used in the mixture 2 pounds to the acre should probably be used on average seedbeds. For some situations, particularly where considerable good alfalfa land exists in a field along with numerous wet spots and where aftermath grazing is desired, both Ladino and alfalfa may be used, the pound of Ladino replacing part or all of the red or alsike clover customarily used.

In pasture mixtures two pounds to the acre of Ladino or wild white should usually be used if no other legumes are included. One pound of either is usually sufficient if some other legumes are added. Ladino and wild white clover spread rapidly by means of runners, thus elinminating the need of large amounts of seed. For strictly pasture purposes, orchard grass and timothy are

the chief grasses to depend on when seeding Ladino mixtures, and Kentucky bluegrass when seeding wild white in a mixture.

A comparatively new long-lived perennial legume, birdsfoot trefoil, deserves some comment. It will grow where alfalfa will not, but it is not suitable for use in short-term rotations. It usually requires two or three years to become well established, and consequently is not very productive for the first year or two. For very long-term seedings where yield may be sacrificed for a year or two, birdsfoot trefoil deserves consideration if the land is not well suited to alfalfa. There is much yet to be learned about birdsfoot trefoil, but it deserves a small scale trial where a legume of its character is needed. Four pounds of birdsfoot trefoil and 6 pounds of timothy is the present recommendation for hay land. For pasture seedings 6 to 12 pounds to the acre of Kentucky bluegrass may be used in addition. It is not desirable to add red clover, alsike clover, Ladino clover or alfalfa to birdsfoot trefoil mixtures. These plants tend to smother the trefoil in the seeding year.

In summing things up, it may be said that every hay or pasture seeding put out this spring should contain a perennial legume, and that sufficient lime, phosphorus and potash should be provided to meet the needs of these legumes.

Get 'em off to a Flying Start . . .

Condensed from American Hampshire Herdsman

E. L. Quaife

Iowa State College

IN any well balanced program for swine production, all factors which influence costs must receive their fair share of attention—poor breeding stock in the hands of a good hogman may actually give better results than the best of breeding stock poorly cared for—the goal is the best of breeding stock well cared for. Let us look into these factors.

The weight of a litter of pigs at 56 days depends much upon the milk flow of the sow, and the milk flow is influenced by feeding as well as by heredity. Some sows give twice as much milk as other sows and these sows need more feed than the sows which produce less. Sows producing heavily need 10 to 12 pounds of feed per day in order to retain their flesh and produce the milk for their pigs. Where sows are hand-fed, and gilts are running with older sows there is great danger the heavy milking sows will not get as much feed as they should. I think that the self-feeding of suckling sows is the right way to handle this problem.

After the pigs are about 10 days old divide up the litters as to age and size and put the feeds in a self-feeder and let the sows eat all the feed they care for. Experimental work by the U. S. Department of Agriculture shows that where sows are self-fed as against others hand-fed, the sows self-fed held their flesh better, the pigs were heavier at weaning time and it required less grain for 100-pounds gain on both sows and pigs.

I am of the opinion, although I do not have any concrete evidence to the effect, that self-feeding the sows may be helpful in preventing scours in little pigs which often occurs when nursing. Some hogmen can hand-feed sows that will do as well as if on self-feeders, but for the rank and file of hog producers self-feeding the brood sows while nursing is a practice which should be adopted more universally.

The weight of the litter is further influenced by the amount of feed little pigs can be encouraged to eat while nursing the sow. This is very important if the litter finds itself trying to get milk from a poor milking mother. Furthermore, sows will begin to decrease

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in milk flow when pigs are about 5 weeks old, just about the time they are making their heaviest drafts on the milk of the sow.

In my experience in weighing pigs, I've seen men who have their little pigs eating feed at a week to 10 days of age, and then there are others who make no effort to feed extra feed more than what the little pigs might pick up from the ground when the sows are fed.

If you self-feed brood sows there is no good reason why the little pigs should not eat the same ration as the sows. If the sows are hand-fed probably a creep should be provided where the little pigs can go and help themselves. There seems to be no great advantage in having a creep, if there is sufficient feeder space and the pigs have opportunity to eat feeds out of a feeder with their dams.

Personally, I like the creep idea, however, and hulled oats or rolled oats are probably the best single feeds with which to start little pigs, and little pigs will start to eat rolled oats or hulled oats at a week of age if given the chance. Cracked or shelled corn should soon come into the picture along with a protein supplement consisting of half and half meat scraps and soybean oilmeal or linseed oilmeal and 20% alfalfa meal.

I recall one bunch of pigs I weighed which averaged 38 pounds at 56 days, and this man said if he'd fed a few more rolled oats, his pigs could easily have weighed 5 pounds more to the pig at weaning time. There isn't anything much better than rolled oats, and cracked corn self-fed, plus a pint of skimmilk and a chance for the pig to nibble at some green alfalfa or clover hay.

There won't be a setback at weaning time if these pigs are eating well. Many pigs suffer a severe setback at weaning time and become runty because they wake up some morning and find the regular lunch counter gone and in its place a self-feeder full of dry ground oats.

Mass production of pigs when they are small is not very successful. The nearer we can come to caring for each litter as a unit when nursing the sow and still have the method practical the more uniform and better the results will be.

It is inadvisable to run too many sows and their litters of uneven sizes and age together. The best way I know to produce a drove of uneven hogs is to run 12 to 15 litters or more together with some litters of 4 or 5 and other litters of 8, 9 or 10. Frequently these large litters are the younger litters perhaps by as much as 2 or 3 weeks.

I have in mind two of our very best hog producers who each keep and market about 200 head of

hogs annually. Their success is due primarily to the start their little pigs get while nursing the sow, and this success is due primarily to the fact that each litter of pigs has a chance to nurse its own mother and the pigs are in their own pen with their mother every night instead of being herded all together in one large pen.

One of Iowa's best hogmen is Harry Fisher. He has a set-up on his farm that allows pigs to be on clean ground every year. His pasture plots are about 3 acres in size, and he runs six to eight litters with about 50 pigs in each lot. Last summer he said he was going to cut the size of his lots and run about three litters together instead of six or eight. If a man who raises 800 to 1,000 hogs a year considers such a plan practical certainly the hogman who raises 10 or 12 litters should work out some plan whereby the litter can be handled more as a unit until they are 6 to 8 weeks of age.

There is always a second mistake made with these litters when running together and that is that the pigs are usually all weaned at the same time. Litters perhaps only 5 weeks of age, pigs weighing 15 pounds being weaned at same time as 8 and 10 weeks pigs weighing up to 30 to 35 pounds. I have weighed up many lots of 80 to 100 pigs where this situation prevailed, and it is invariably the late litters that were losing out on weight for age, because of being robbed, or because the dam wasn't getting as much feed as she should.

The third matter has to do with castration, a task which is too often left for a rainy day. Sometimes the pigs have become pretty well grown before the right rainy day arrives and the pigs suffer quite a setback.

This job can be well done and better done when pigs are about a week old — in fact, we have some producers who are getting the job done when the pigs are as young as 3 days. It is a task which should be done earlier than most hogmen realize.

The most critical time in the life of the pig is the period from birth until the pig is about 50 pounds in weight. If a man can bring his pigs up to 8 weeks of age, thrifty and free from worms, and have these pigs weighing around 35 to 40 pounds his big task as far as that bunch of pigs is concerned is pretty well done.

Just how this can be best accomplished depends a great deal upon the set-up and the plan of hog raising. If you farrow late pigs, they may be farrowed out in a clean field where they have a chance to avoid old infested yards.

The man with earlier pigs who uses a central house has a slightly

more difficult problem. I think a good feeding floor either of wood or cement alongside of the hog-house is a wonderful asset for these earlier pigs. If dirt is fed to these pigs and the right sort of ration, there is no reason why the pigs shouldn't remain on such a feeding floor until they are 40 to 50 pounds in weight and they may then be shifted to a pasture field. The sows could go out to this floor to eat out of self-feeders and then back to their own pen with their litters at night.

One of our good hog producers has a cheap exercise shed at the end of his farrowing house. After the pigs are about a week old the sows are let out through the alley and they go out into a yard where they are fed as a unit. This yard is bedded with straw so that when these sows go back to their pens for nursing the pigs the udders are perfectly clean. There is no chance for them to become soiled. The pigs go out the other way to this exercise shed. This is bedded with clean straw and sods of dirt about 6 inches square are thrown about in this straw and there the pigs exercise and get a chance to get all the dirt they need to avoid anemia. The pigs and the sows are in their own pen every night. This may seem like a lot of work, but these men are doing this before their farm work starts. By the time farm work starts the pigs are ready to go on self-feeders and take care of themselves.

Weigh your pigs at 56 days: then in the fall select out the best gilts and breed them to as good a boar as you have gilts, feed well before farrowing and self-feed the suckling sows afterwards. Get your pigs to eating feeds such as rolled oats and cracked corn early and do not let the barrows know that they were ever boars. Treat the litters as units as far as practically possible and do not crowd the pigs too much while small. And last but not least give your pigs a chance to keep healthy.

Farmers Use Record-keeping Cooperative

Condensed from Extension Service Review

D. M. Babbitt

County Agricultural Agent, Hunterdon County, N. J.

ALTHOUGH the New Jersey farm account book has been available as a farm bookkeeping form and the Extension Service has recommended its use for several years, it took the Bureau of Internal Revenue to get many farmers to take farm record-keeping seriously. During recent years, from 75 to 100 farmers each year purchased books and started out with good intentions of keeping records but most of them failed to complete the job.

The change in income tax requirements affecting farmers necessitated complete farm records, and in the early months of 1941 many farmers found that something better than their memory or check-book stubs was necessary to fill out income tax forms.

Knowing that the task of keeping a good set of farm records, even though the form is simplified as much as possible, is more than most farmers will be able to carry out, the county agent proposed the cooperative record - keeping project. The Board of Agriculture endorsed the project and sponsored it by offering any financial assistance that might be needed to get it started.

The record-keeping project employs the principle of cooperation. Those farmers who felt the need of help in keeping their farm accounts, jointly employed a traveling bookkeeper who visits each of them monthly. A simple record of all receipts and expenditures made during the preceding month is kept in a cigar box, on a spike file or hook, or in a handy little notebook or pad which fits the overall pocket. These records are placed in a convenient location with the farm account book so that the cooperative bookkeeper has access to them for the monthly record posting and balancing of the account at the time of his visit which is made in a circuit to cover the county. The job usually takes from ½ hour to 2 hours a visit depending on the size of business conducted by the member. Items of receipt and expenditure are carried under appropriate headings and after being totaled are transferred to the summary sheet so that the

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cooperating farmer knows at the end of each month where his business stands to date.

At the end of the year, the total of the 12 months' business furnishes the items for the income tax report as well as for a credit statement and other uses. The co-operative bookkeeper, in addition to totaling the accounts, helps the member in opening a new set of records for the coming year. These records include a complete inventory. When income tax forms are ready, the bookkeeper takes care of filling them out if this service is wanted.

The charges for the bookkeeper's services are $1.25 monthly for the monthly posting job where the gross annual receipts are under $5,000. Where these receipts are between $5,000 and $10,000, the monthly charge is $1.50; where the income ranges from $10,000 to $15,000, the charge is $2.50 a month; and a $3 per month charge is made where the gross income is more than $15,000 yearly. A charge similar to the monthly charge is made for helping the member with his inventory, and another charge similar to the monthly charge is made for filling out the income tax form.

The project is directed by a committee of 5 members appointed by the executive committee of the Board of Agriculture. Thirty Hunterdon farmers completed records in 1941, and 41 used the services of the project for 1942 records. Quoting some of the members, it is an easy and most satisfactory method for getting a complete and accurate set of farm records. The Board of Agriculture and the Extension Service, which are cooperatively supporting the project, hope to expand it and, as records are completed, make efficiency studies of them so that they may serve more useful purposes than income tax reports and credit statements.

The Family Rabbitry — How to Manage It

Condensed from New Jersey Agriculture

Willard C. Thompson

Professor of Poultry Husbandry

THE possibility of the domestic grain-fed rabbit as a supplemental source of highly nutritious meat may be considered as one phase of the war effort toward increased food production. Many families may find themselves in a position to maintain a small "family-size" rabbitry not for the purpose of raising rabbits to sell, but primarily for the objective of producing, at very economical costs, an occasional rabbit meat dinner for the family.

Three breeding does and one male rabbit, or buck, will constitute a useful unit for this type of rabbit keeping. Each adult doe may be bred safely at least three times each year, even four. The gestation period of the rabbit is 30 days. The litter, usually averaging 5 to 7 in number, remain with the doe for about six weeks, after which time they should be weaned. The mother rabbit then should be rested for from two to four weeks before being bred again. Some such breeding program as this will give the family 15 to 20 young rabbits per year per doe. This means an output of approximately 35 to 45 young rabbits from this 3-doe rabbitry, a sufficient supplement of economical rabbit meat to satisfy the needs of the average family.

Rabbits are best managed in individual hutches. This rabbitry would require four hutches for adult stock. Each hutch should be approximately 30 in. wide x 24 in. deep x 24 in. high. The four hutches may be arranged singly or in pairs, backed up against each other or in pairs arranged beside each other, or in a tier of four hutches, one on top of the other. The arrangement will depend upon the space in which the rabbitry must be located. The important item is to have an individual hutch for each adult rabbit. There should be three additional hutches for the respective litters removed from the mother's hutch to be kept for slaughter at an age of four to five months.

The floor of the hutches may be made of wire netting (if available) or wooden slats or even wooden boards. In a small rab-

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bitry the sanitary care of the hutch is not a large problem and, therefore, almost any kind of a hutch, with the space already indicated, will work out satisfactorily.

Each hutch should be provided with a water pan which can be hooked or wired to some part of the wall; likewise, each hutch must have a mash cup or pan which is held in place; some corner of each hutch should have a small rack in which clover or alfalfa hay and sometimes green food can be placed where the rabbit can eat it without waste.

The feeding of rabbits is relatively simple. Adult does, which are being bred at least three or four times a year, should be given sweet, skim milk as a beverage daily, beginning one week before kindling and continuing until the young rabbits have been weaned. This will require about three-quarters of a cup of milk per rabbit each morning. At noon, whatever remains of the milk should be thrown out and the cup thoroughly cleansed and filled with fresh water. The feeding of milk to young rabbits for at least 8 weeks is also desirable. The use of milk for the buck is not necessary. All rabbits must have either milk or water constantly before them.

The second part of the rabbit feeding program consists of furnishing, daily, a tablespoonful of whole grain, preferably plump feeding oats, to each adult rabbit and to each youngster after weaning. Some rabbits will eat oats more eagerly than others. Experience will have to determine just how much oats to feed each day.

The third item in the rabbit diet consists of some fresh vegetables such as, carrots, cabbage, celery, clover, alfalfa, sprouted oats, radishes, or turnips. Some one or other of these will usually be available from the family kitchen in amount sufficient to take care of the small rabbitry. Fresh young grass, clover, or alfalfa can usually be cut in the vicinity in the proper season and need not constitute any item of cost.

The fourth element in the rabbit feeding program is the use of a mash or some recommended form of complete ration pellet which may be available, commercially, in the vicinity. The writer has fed many rabbits on the following mash mixture: 2 lbs. wheat bran, 1 lb. yellow corn meal, 1 lb. standard middlings, 1 lb. crushed heavy oats, or pinhead oats, ½ lb. white powder or milk sugar feed. The mash should be made up crumbling moist with water or skim milk *each day*. The average adult rabbit will eat about 1 tablespoonful of this mixture per day. The mash cup should be kept scrupulously clean. Any mash that has been moist-

ened should never be held over and fed the next day.

No litter is necessary except for sanitary purposes and for the use of the doe at kindling time. If a wire bottom hutch is used, a nest box with a solid floor should be installed about one week before kindling. Into it is placed cut straw or other litter. If a wooden floor is used, any good litter material may be used to keep the pen in sanitary condition. The litter should be absorptive and not dusty. In this small rabbitry, sanitary cleaning of the hutches can be done at least every other day.

Hutches can be located in barns, sheds, or outbuildings or even built as units to be located in some section of the backyard, in which case they must be protected from the weather.

Rabbits are not difficult to breed, feed and manage. Their prolificacy makes it unnecessary to carry other than just a few breeders.

Fibers

Some of the fibers from the Far East cut off from the United States by war conditions are already being produced in commercial amounts in our own hemisphere: sisal in Haiti; henequen in Mexico and Cuba, flax and hemp in Chile and Peru, and jute in Brazil.

—*New England Homestead*

Suggestions for Southern Sheepmen

Condensed from The Southern Planter

L. I. Case

North Carolina State College

THE war has put a premium on sheep production in the South. Satisfactory means of parasite control, better management methods, and ready markets for lambs and wool have paved the way for profitable flocks of sheep on thousands of Southern farms.

There should not be a flock of sheep on every farm. Yet, experience has demonstrated that a small flock of well-managed sheep can convert much coarse feed, rough pasture and winter grazing, that might otherwise go to waste, into a profitable livestock product. Sheep raising has been one of the best paying branches of the livestock industry in North Carolina in recent years.

Wool and lambs are important in the war effort and are profitable. Last year, 15 farmers in eight sections of Watauga County kept flock records for County Agent H. M. Hamilton and found that the profit per ewe amounted to an average of $15.60. The 15 men kept 247 ewes from which they raised 300 lambs. The value of the lambs was $3,374.43 and the returns from the wool were $791.48 making a total return of $4,165.91. One of the men, Howard Gragg of Boone, Route 2, raised 19 lambs from 11 ewes and had a gross income of $25.20 per ewe from the sale of his lambs and wool. These Watauga sheepmen are improving their stock by importations of western ewes and the use of purebred rams.

Cora D. Carson of Sparta, Alleghany County, paid $260.00 for her flock of sheep in 1941. Her 28 ewes grossed $408.80 in 1942, notwithstanding the loss of two of them just prior to lambing time.

Farm flock records for North Carolina as a whole show an average gross income of $14.58 per ewe in 1942. This is about $3.50 higher than the previous year, and reflects the good prices farmers received for both wool and lambs. Mountain farmers made higher gross incomes than did farmers in the Piedmont and Coastal Plain, but in most cases, the cost was higher due to the

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necessity of feeding more harvested feeds, while the Eastern sheepmen make greater use of green winter grazing crops. The average estimated cost of keeping a ewe was $4.02 last year.

These records from all parts of North Carolina bring out some interesting facts. As would be expected, they show a close correlation between profits and percentage of lamb crops. They also show that the most successful sheepmen use good rams, feed their flocks well, dock and castrate their lambs, treat regularly for internal parasites and sell both their lambs and wool cooperatively. Most farmers favor selling their lambs by grade.

This is a critical season of the year on the sheep farm. The annual lamb crop is being harvested and, unless the most of it is saved, part of the year's work will be wasted. A ewe in normal flesh at breeding time should gain from 15 to 20 pounds from then until lambing time. About a month before lambing most sheepmen start feeding a small amount of grain to the ewes. If they are in reasonably good flesh, one-half pound per ewe daily of home-grown feed such as corn, oats, barley or wheat along with legume hay is sufficient. If legume hay is not available, add a small amount of protein concentrate such as soybean, cottonseed, or peanut meal to the grain feed. After the lambs have arrived the feed may well be increased to three-quarters to one pound per day.

In connection with winter feeding, too much emphasis cannot be placed on green winter grazing crops. Nor do I mean just enough of these crops so that the sheep and other stock keep it continually grazed to the roots. On the other hand, a winter grazing crop worthy of the name should be of sufficiently heavy seeding and large enough acreage for the sheep to get a fill in a short time and then lie in a comfortable place to digest it. Some Eastern Carolina sheepmen who raise top lambs carry their sheep on nothing but green winter cover crops the entire winter, but as a rule some dry feed should be given.

At lambing time be on guard to save every lamb possible. Be on the watch for disowned lambs, chilled lambs, and ewes not giving enough milk. Give special attention to orphan lambs by transferring them to other ewes or frequent feedings from a bottle. Guard against young lamb troubles such as navel ill, pinning, diarrhea, constipation, indigestion and sore eyes. Navel ill can be avoided by swabbing iodine on the navel cord soon after the lamb is born. Pinning results from the collection of a mass of dung at the base of the tail. This should be watched and removed. An enema of warm water or a

mild laxative (one or two teaspoons of castor oil or milk of magnesia), or both, may be needed to correct constipation. Diarrhea, or scours, often results from too much milk or feeding spoiled feeds to the ewe. First, eliminate the cause, then, give the lamb a mild laxative. If sore eyes develop, wash the eyes frequently with a 2 per cent solution of boric acid, or put a few drops of 10 per cent argyrol into the eyes daily until the trouble clears up. To save a high percentage of the lambs may require some lost sleep but the owner will be well repaid in satisfaction, not to mention increased profits.

Smart sheepmen rush their lambs to market weights before hot weather arrives. Our records reveal that it pays to get early lambs, finish them quickly, and sell them before summer. They should weigh 80 to 85 pounds in 100 to 120 days. Lambs go backwards in hot weather, the parasite hazard increases, and the danger from dogs is always a threat. To catch the early market, lambs must get plenty of milk. There is no substitute for milk in making lambs grow and fatten.

Because milk is so important, ewes with twin lambs should be separated from those with single lambs and given more feed. Or creep feeding of lambs may be advisable during the period from the time the lambs are old enough to eat until an abundance of grazing is available. Locate the creep under cover, preferably at the sunny edge of the barn. Corn should make up all, or at least the greater part, of the lamb ration. At the start a little wheat bran may be fed with the corn, which should be ground until the lambs are six weeks old. If the ewes are not giving enough milk, it will pay to feed a more complete ration to the lambs. Four parts corn, two parts oats, one part bran, and one part soybean, cottonseed or peanut meal makes an excellent lamb feed. Some fine-stemmed legume hay will be relished by the lambs until good grazing arrives.

Don't forget that ram lambs usually bring $1.00 per hundredweight less than ewe and wether lambs. Dock and castrate when the lambs are five days to two weeks old. Also don't forget that it is our patriotic duty to take better care than ever of the wool this year. Fix up the feeding racks so the wool won't get seedy and chaffy. Clip the wool from the inside of the hind legs of the ewes before turning them on succulent grazing. Order that paper twine now so it will be on hand at shearing time. Have those combs and cutters sharpened early. Get ready to save every pound of wool for our soldiers, our sailors, our flyers and our marines.

Do You Have a Halfway Flock?

Condensed from Everybodys Poultry Magazine

Ken Martin

IT'S like looking in a year-old newspaper for war news to say that Secretary Wickard has asked for 28 per cent more chickens and 8 per cent more eggs in 1943 than were produced in 1942. Most flock owners know about that.

I'm only repeating it because I believe I know exactly where to go to get that big increase with scarcely any increase in equipment, buildings, or labor. I do not say this because of a dream, but because of figures that census takers have put down. Here's what the figures show:

Over half the flocks on farms have fewer than 50 birds in them. One flock out of five has from 50 to 100 birds. One flock in seven has from 100 to 200 birds.

Two-thirds of all chickens on farms are in flocks of less than 200 birds. Nearly half of the chickens are in flocks numbering 50 to 200. One-fifth of all chickens are in flocks numbering under 50 birds.

Take another look, now, at those flocks ranging in size from 50 to 200 birds, comprising close to one-third of all flocks and close to one-half of the total poultry population. That's the place to get the increase asked for in 1943. Flocks of that size—50 to 200 birds—are what you might call the forgotten flocks of the poultry industry.

A flock of this size is frequently regarded as a side line. Some of these in-between flocks produce more eggs and meat than are needed for the flock owner's use, and still not enough to sell to advantage and bring in a profit worth talking about. As often as not, the owner of one of these 50 to 200-hen flocks regards all the income as profit, because he spends little for feed—just throws out some home-grown grain after the birds get past the baby chick stage.

From these halfway flocks we can get the needed poultry and egg increase. These flocks are the logical expansion joint in the poultry industry. It takes as much labor and equipment to look after a flock of 50 or 100 as it does to look after 250 or 300. Likewise, a 10 by 12 brooder house can produce the birds for a flock of 250 or 300 layers as well as for a flock half that size.

A flock owner who increases his "half-way" flock to 250 or 300 layers can buy commercial feed

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to better advantage. He will get enough eggs to send a case of eggs to the auction, where the eggs can be graded and sold on a quality basis. He will have more cockerels to sell, and of better quality.

He can afford to build an egg cooler so his eggs won't lose quality in hot weather. He can afford to fence the chickens out of the garden and the barnyard, and turn over an acre or so of good green range to the growing stuff. He can afford to do these things, because with 250 to 300 layers, his birds are no longer a side line; he is no longer a marginal producer, but has an economical poultry unit.

Now, let's get down a little closer to poultry management. Let's say here's a flock owner who puts 100 pullets in the laying house each year. What to do? Either move up to get out of the halfway class, or else step down to 30 or 40 layers—just enough to supply the family.

How about the flock owner who wants to get out of the inefficient halfway class by stepping up the size of his flock? Well, suppose he is replacing all his 150 hens with pullets each year. He will have to buy, say, 600 to 700 chicks. To brood them in his 10 by 12 house, he will get them in two batches. When the first batch is old enough to get out from under the brooder stove, he puts the second ones in. From the 600 to 700 chicks, he can expect to raise 250 to 300 good pullets, if he has good, clean range.

If for any good reason a flock owner can't brood the 600 to 700 chicks in two batches, there's another plan he can follow to get out of the halfway class. He can keep 100 to 150 of his best layers over for a second year of laying. That way, he will not need to brood 600 to 700 chicks, but only 350 or 400. Out of these chicks, he can expect to raise 150 to 175 pullets to put in the laying house along with the hens, so as to have a laying flock of 250 to 300 good birds.

A flock this size is not a commercial flock; it doesn't require the full time of one person; but on farms where poultry is just one unit of a diversified farm business, a flock of this size is a profitable unit, of a size that doesn't take too much time from other farm operations.

Ask the commercial poultryman, with 1,000 birds or more (and no hired help) to step up his operations, and he is faced with different problems. If he increases to 1,500 birds, maybe he has more work than one man can do.

Increase to 2,000 layers, and it is necessary to hire a helper. Besides, the new buildings and equipment needed for the increase would run into money—

assuming building materials and equipment could be had. When a commercial poultryman wants to expand, he must make a jump that will land him safely in the middle of an economical production unit—say a one-man unit, or two-man unit.

My plea, in brief, is for farm flocks of either 50 or 250—in between is a sort of no man's land. Total egg and poultry production would slip down somewhat as a result of holding the "subsistence" flocks down to 50 birds or less; but that would be much more than offset by the big increase from flocks stepped up to 250 or 300 layers. A flock owner with that many birds kept for profit instead of meat and eggs for the table and a little pin money for groceries, just naturally gives his flock better care and feed.

Stakes for Tomatoes

The prime method of getting big yields of tomatoes on a small area is to stake up the plants. Staking reduces losses from trampling, rotting, insects, and animals. It makes room for many more plants. Some idea of the value of proper staking can be gained from the fact that commercial yields with this method have sometimes reached 50 to 60 tons to an acre, as against an average of 10 tons where plants are not staked.

To get the full value of staking, plants must be fed enough nutrients to provide the nitrogen and minerals required for the larger quantity of tomatoes. And such plants must also have adequate supplies of soil moisture at all times in order to reach their greatest productivity.

Staking tomatoes requires a considerable amount of work and material and would not usually be profitable for commercial growers who lack plenty of cheap help and irrigation equipment. In times of good prices growers who have these, and home gardeners who lack plenty of garden space, can derive advantages by staking.

Two methods of staking are commonly practiced. In one method four stakes are leaned together and fastened. The stakes, spaced 2 feet apart, are not driven into the ground. This saves the labor of driving and prolongs the life of the wood many years. Such stakes can quickly be removed from the garden at the end of the growing season.

The other method uses single stakes, which must be driven firmly into the ground.

In tying tomato plants, strips of old rags are better than string or wire.—*New Jersey Agriculture*

Scarce Legume Seeds

Condensed from Successful Farming

C. J. Willard and L. E. Thatcher
Ohio Agricultural Experiment Station

IN the spring of 1942, seed supplies of sweet clover and alfalfa were extremely short, leading to the second highest prices in two decades. For 1943, estimates of the U. S. Department of Agriculture indicate that the supply (1942 crop plus carryover) of sweet clover seed is nine percent below last year's short supply; of alfalfa, 11 percent less; of alsike, 15 percent less; and of red clover, 20 percent less than last year. Since the supplies of red clover for seeding in 1942 were considerably in excess of requirements, the supply this year is almost normal, despite an extremely short 1942 crop.

The seed situation promises to be even more acute in 1944. There will be a greater demand for hay this year. There are fewer acres of legumes to furnish the hay and seed required. If a production catastrophe is to be avoided in 1944 and 1945 every possible effort must be made to produce clover and alfalfa seed this year.

But the seed for this year is already in farmers' bins and dealers' warehouses. Can we, by making the best use of every available pound of seed, produce sufficient good sods with this year's supplies of seed?

If less seed is to be sown on more acres, it means using less seed per acre. Under perfect conditions, two pounds per acre of clover or alfalfa might suffice. There are about 225,000 seeds in a pound of alfalfa, 275,000 in a pound of red clover. One pound per acre would place five to seven seeds on a square foot. Ten plants per square foot are ample for satisfactory yields. Half this stand, while thin, is better than many farm stands which give fair to good yields.

Rates of seeding are the product of experience and experimentation, with emphasis on experience. Too often heavy rates of seeding are used to make up for poor preparation of the land and slipshod seeding methods. *In this year of shortage the man who wastes precious legume seed by careless seeding methods is akin to the saboteur.*

Few experiment stations have

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recommended seeding rates for alfalfa in strict accord with their experimental results. Thirty years ago, the Ohio station conducted rate-of-seeding tests with alfalfa in which 10 pounds per acre gave the highest yield and five yielded nearly as much. Of eight published rate-of-seeding tests from as many states only one gave significantly higher yields of hay from rates greater than 10 pounds. Yet rates of seeding recommended by different states range from 10 pounds up to 20 or even 25, centering around 15 pounds per acre. Only one state, Michigan, definitely recommends a rate lower than 10 pounds.

Recently the Ohio station conducted a rate-of-seeding test of alfalfa in the main alfalfa-growing area of the state, a region of black soils similar in many respects to those found from Ohio west to Nebraska. Ten rates—from two and one-half to 50 pounds per acre—were tried, and there was no significant gain in yield for any rate above seven and one-half pounds per acre. As a five-year average of three different seedings of both Grimm and common alfalfa, as little as two and one-half pounds yielded only 12 per-cent less than the highest yield.

But how about quality of hay? Many believe that heavy seeding rates give a finer, leafier hay. In this test, the hay from thin rates of seeding was definitely coarser than that from thick rates, but the differences were not great. There was no difference in the percentage of leaves in the hay, or of protein in the hay, for any rate from the lowest to the highest. It does not appear that heavy seeding rates are justified by the quality of hay produced.

Strange to say, experimenters have rather assumed that everybody knows how to grow red clover, and specific experiments with it are rare. A three-year comparison of five pounds and 10 pounds per acre at the Northwestern Experiment Farm at Holgate, Ohio, gave no differences in yield, quality, or composition of the hay from the two rates.

Thus theory and practice agree that *if we use good seeding methods,* we can cut rates of seeding usually recommended in the Cornbelt by one-fourth to one-third. Specifically, rates as low as five to six pounds per acre of red clover; six to eight pounds of alfalfa; three to four pounds of alsike; six to eight pounds of scarified sweet clover; and eight pounds, instead of 10, of clovers and alfalfa combined in seeding mixtures will be sufficient with good methods. It should be understood that these are *low* recommendations, with little margin of safety.

Don't waste irreplaceable seed on soils where it has no chance.

A lot of the seeding failures blamed on the weather really result from lack of lime or phosphate.

What seeding techniques will make best use of our limited seed supplies? There are two main seeding situations — seeding in wheat, and seeding on prepared seedbeds either in oats or alone. Seeding in wheat is more common in the southern half and eastern end of the Cornbelt. Seeding in oats or other spring grain is more common in the northern part of the Cornbelt and north.

Should we sow in a companion or "nurse" crop at all? Usually, yes, especially this year, when we can feed every pound of grain we raise. But let's recognize the so-called "nurse crop" for what it is—a crop which robs the forage seedlings of light, water, and nutrients, often to their death—surely a peculiar nurse! Successful seeding methods must reduce this competition as much as possible.

Granting that you decide to seed your legumes in winter wheat, it follows that some rather close attention is indicated to insure an equal chance for both. Applying a mulch of four to five tons of manure (or one and one-half tons of straw) per acre on wheat any time from Thanksgiving to New Year's is recommended by Ohio because it has repeatedly been proved to help insure seedings in winter wheat. Such mulch saves moisture at the surface and also reduces the chance that the seedlings will be killed by untimely freezes.

Now ask almost any group of farmers when and how they seed legumes on winter wheat, and you will find some who broadcast in February, others in March, and some who drill up to late in April. In long-time experiments in central Ohio, broadcasting March 10 to 20 has been most favorable—as far north as Indianapolis, Indiana; Springfield, Illinois; or the Kansas-Nebraska boundary. The best date will be during freezing and thawing when the frost usually leaves the ground but while the soil is too wet to drill. If seeding in wheat is delayed until a drill can be used, drilling also gives better results than broadcasting at that time. But broadcasting earlier, we repeat, is generally better.

A favorable spring and good soil often produce a heavy companion growth of wheat that is likely to lodge later. When the wheat is likely to lodge it pays to clip, setting the mower four to five inches high, and removing six to ten inches of leaf growth. Do this before wheat starts to shoot. The best period for doing it is not over a week.

In 1942 at Columbus, the wheat we did not clip lodged so badly that the clipped wheat out-

yielded it. It was a real satisfaction to cut or combine that clipped wheat, compared to the tangled mass of the unclipped wheat! However, in years when unclipped wheat does not lodge, clipping will cause a loss of three to five bushels per acre of wheat. Yet clipping may save the legumes, especially alfalfa, even when the wheat does not lodge. Giving the seedlings light at a critical period brings them thru. Pasturing the wheat for a week or 10 days at this time will have the same favorable effects as clipping.

First rule when sowing in or with spring grain is to cut the rate of seeding the grain. Sow not more than six pecks per acre of oats, less of barley or spring wheat. In normal seasons the rate of seeding the grain makes little difference in the stand obtained, but in a dry season the thin stand may have half again as many legume seedlings as the thick stand. In wet seasons, thick-sown grain lodges sooner than thin-sown, killing the seedlings. This is the greatest hazard of thickly sowing spring grain companion crops.

Avoid sowing clover, alfalfa, and grass seed too deep. At the Ohio, Minnesota, and Wisconsin experiment stations, clover and other small seeds sown an inch deep have produced about half as many seedlings as the same number of seeds sown one-fourth to one-half inch deep.

Where oats are drilled, the clovers are often sown from an attachment on the drill box. The delivery tubes usually let the forage seeds fall in front of the grain disks, burying them one to three inches deep. Equally good stands have been obtained with half the seed by attaching long tubes which drop the seed back of the grain disks. Broadcasting at once after seeding the oats gets the same results.

A still safer method, either after seeding oats or when seeding alone, is to broadcast on cultipacked ground and cover with the cultipacker, harrow or weeder. This cultipacker method is more reliable on loose seedbeds than any drilling method, even the special grass-seed drill. This is because the seed falls on firm ground and is covered at about the right depth. Many farmers roll or cultipack after seeding, but cultipacking *before* seeding is the important time. The Wisconsin station has mounted a seed box between the sections of a double cultipacker, doing the job in one trip. Harvesting the companion oats crop by pasturing is one way to obtain good seedings.

Seeds of Victory

Condensed from Marketing Activities

Jim Roe

THIS spring bearded Soviet farmers will pour Corn Belt-grown timothy, clover, and alfalfa seed into boxes on their grain drills—perhaps to plant it in cold Siberian land that never before felt keen bite of a plow. California-produced seed of carrot, beet, and cauliflower will be carefully covered with British soil. Bags of these and many other U. S. produced vegetable and field seeds are even now being stowed away in the holds of merchant ships — each shipment dispersed among many ships of the convoy, to help insure safe arrival of most of the seed. Sky freighters have rushed shipments to Brazil, India, Africa, and other far-flung points, when planting seasons have not respected the time schedules of surface-ship convoys. The United States which once imported many such seeds, is now producing all her own—and helping to seed the rest of the Allied world, too.

At the same time, many of us here at home have become alarmed over the high prices of alfalfa seed. We've grumbled when clover seed was hard to find in some localities, and alsike was almost unobtainable. We've had some doubts as to whether we should be shipping seed to the rest of the world, when we've had to scratch around to find enough seed to plant the increased acreages called for by our production goals.

But let's ask ourselves one question. With food shortages developing here at home, what is the best way to cut down the quantity of food we ship abroad and still keep our Allies in the fight? Seeds are the answer. We must, more and more, help people abroad to help themselves by growing their own crops. Food supplies are too short in Great Britain and Russia to allow crops to go to seed; so seed must come from the more peaceful and fertile acres of the United States.

It's sound shipping sense, too, for us to send seeds. Fresh vegetables are desperately needed at the fighting fronts, but they are bulky and perishable. So they usually reach the fighting men in canned or dried form, and then only in small amounts. A single pint jar, on the other hand, can carry enough seed of the hardy, quick-growing rutabaga to produce 500 bushels of the fresh vegetable! A bushel bag of tim-

Reprinted by permission from Marketing Activities, Washington, D. C., Jan., 1943

othy seed will plant 4 to 6 acres, and produce good livestock feed on almost any soil in the world! It takes but 2 *ounces* of tomato seed to grow plants enough to set an acre of ground, and produce perhaps 10 tons of vitamin-filled fruit.

For most crops, we're able to ship seeds abroad and still have an adequate supply left for our own use. The one exception is the group of legume crops: our production was low in 1942, and foreign demand for these is especially large. Commercial fertilizers are rare in countries near the fronts, and even if our supplies were ample, shipments of fertilizer would occupy too much cargo space. Legume seeds, therefore, are needed to plant crops which will maintain and build fertility.

Russia needs large quantities of northern-grown alfalfa seed—more than we will be able to send her. Last season brought the lowest production of alfalfa seed in 10 years, due to lower acreage and a rainy season. As a result of the poor season and the increased demand, supplies of northern-grown alfalfa seed will generally be short this spring, and prices will probably be the highest they have been since World War I. Substitute crops undoubtedly will have to be planted on many acres originally set aside for afalfa.

Red clover supplies should be ample, for there was a good-sized carryover of seed from 1941. Production in 1942 was 26 percent lower than 1941, but was still above average.

The 1942 crop of alsike clover seed is one of the smallest ever produced, with the Canadian crop also far below average. A wet season was the main factor that brought our production 19 percent below average.

Though sweetclover production in 1942 was the smallest in 8 years, and supplies will be smaller than last year, a carryover of more than 11½ million pounds from 1941 helps relieve the situation. Due to the combined circumstances of supply and price variations, there will probably be some substitutions of sweetclover in place of alfalfa. A stand of sweetclover is much easier to obtain, as a rule, than alfalfa, and the clover will fit in the farm program allotments the same as alfalfa.

There will be plenty of lespedeza seed, for the 1942 production topped that of 1941, and is 2¾ times as large as the average. Killing frosts in late September cut production heavily, or the crop would have been even larger. We do not export and import lespedeza seed, so the entire production is available to U. S. farmers.

Though timothy is now being shipped abroad in large quantities,

there is plenty of seed left to meet all domestic demands. Last year's crop was the largest in 5 years, and Canada's crop was also large. There will be plenty of seed for redtop, bluegrass, and in general, all grasses. There will be some substitution planting of grasses in place of legumes this season, which are scarce because of the competition of other crops and poor weather.

Though the field crops seed picture is a mixture of abundance and scarcity, supplies of all vegetable seeds are ample. Production of vegetable seeds in 1942 totaled 334 million pounds, 26 percent larger than the crop in 1941. About 95 percent of this total is produced by 119 commercial seed growers. Increases in production were most marked for about a dozen vegetables. These, together with their percentage of increase over 1941, were: broccoli—231 percent more than in 1941; chicory—228 percent; rutabaga—200 percent; Swiss chard—199 percent; garden beet—162 percent; endive—159 percent; cauliflower —156 percent; celery—131 percent; carrot—118 percent; and pole lima beans—114 percent.

Increasing numbers of foods probably will become rationed during the course of the year and potatoes are destined to occupy a more and more prominent place in our diets. We're well prepared here, for the 1942 crop of certified seed potatoes was the largest on record. A total of nearly 20½ million bushels, 9 percent larger than the previous record of 1940, were certified, with prices on December 1 running about $1.63 a bushel, compared with 93 cents a year earlier.

All this extra seed production hasn't come with the flip of a switch. Seedsmen and USDA specialists alike foresaw these huge war demands, and began to make plans which have resulted in our present supplies of seed. We formerly imported large quantities of vegetable seeds from Holland, Denmark, Norway, and other countries of Europe. England obtained her seeds from these same sources and from Hungary, Czechoslovakia, Germany and other countries. Russia, before the Ukraine farm lands were overrun, raised many of her own.

As far back as 1939 there were rumblings in the U. S. seed picture. We began to hear of California seedsmen producing cauliflower seed, when nearly all our total supply of this seed was normally imported. Small but constantly growing amounts of other formerly imported vegetable seeds were harvested, and production was boosted in those varieties whose seed stocks were normally produced in part in this country. Now our seed production assembly lines are running at high

speed, though the throttle it still far from wide open. In cauliflower, for instance, production has zoomed to the point where we now fill the needs of all the United Nations, and at a price below that which we used to pay for imported seeds.

Farmers in Allied countries have already produced substantial quantities of food from American-grown vegetable seeds, and seeds from home have followed our armed forces to many far-off spots on the globe. American soldiers in isolated outposts often have their own vegetable gardens and produce much of their food. These gardens also come in handy in countries where locally grown fresh fruits and vegetables are not those which U. S. doughboys crave. Bombers and warships, therefore, carry seeds to these outposts, as well as ammunition and the more grim supplies of war. Newly constructed airfields are camouflaged with quick growing crops, and take-off runways are planted to the hardy creeping fescues, which form a low-growing, tightly knit sod.

Many millions of pounds of both vegetable and field seeds have been shipped to England and the U. S. S. R. "Best-sellers" in the vegetable group are onions, carrots, peas, beans, lettuce, beets, cabbage, and radishes, with timothy, alfalfa, red clover, ryegrass, alsike clover, brome grass, and orchard grass the most popular field crops. Dozens of other seeds are required, too, including corn, soybeans, vetch, buckwheat, beans, peas, turnips, and lettuce. Enough tobacco seed has been sent to the Soviet Union to plant 100,000 acres of potential cigars or cigarettes.

For English use these seeds are purchased more generally over the country, while most of the Soviet field seeds are from the Northwest, to make certain they will be climatically adapted. As Nazi armies occupied Soviet farm land, many farmers took their implements and moved farther north, to Siberia in some cases, and began farming operations on what was in many instances unbroken land. Hardy varieties are necessary here. Minnesota 13, with a 90-100 day season, is the corn which has filled the largest share of the Russian orders, and the seed of still earlier varieties is wanted. Early Improved Golden Glow and Improved Leaming have each made up a portion of the supply. Few hybrids are sent, for some seed must be saved from each crop, though total seed needs cannot be met because of lack of land area.

Illini, Minsoy, and Manchu—each with a season of from 95 to 110 days— are the soybean varieties which suit Soviet conditions. Bromegrass, a familiar crop in the U. S. S. R., is being shipped

in large amounts, while some strangers to Russian soil, such as slender wheatgrass and Western wheatgrass, are accompanied by cabled seeding and handling instructions from the U. S. A.

Essentially the same types of seed go to England, though most of the corn for British shipment is of a silage variety. Corn as a grain crop does not grow well there, and most of the seed corn imported to English farms is used for silage or fodder.

Grasses and legumes are the British favorites, for use as feed for sheep and other livestock.

One of the newest developments in the British seed importing picture is the shipment of 4 carloads of seed collections, or kits. 80,000 of these collections, each weighing 2 pounds, were included in the shipment, which was sent from the United States by the British War Relief Society. Each collection contains enough seeds to plant a complete Victory Garden of beans, peas, cabbage, carrots, onions, radishes, and other typical garden vegetables. This summer many a London backyard will sprout carrots instead of weeds or tin cans, and the British have reported radishes saucily thrusting their green tops out of the earth covering bomb shelters.

An army of vegetable eaters has descended upon Australia, in the uniforms of the United States. Australians, who normally consume a much smaller amount of vegetables than do Americans, were suddenly confronted by huge demands for fresh vegetables for our Army's use. So, as our transports docked and troops filed off, Australian requests for additional supplies of vegetable seeds were frantically dispatched to American firms. The orders were filled and Australia, with her topsy-turvy season (our Fall is their Spring, and vice versa) is, now growing more vegetables than ever before in her history.

How long these additional markets will last once the war is won is a guess, but as long as there are hungry people in the world, it's a safe bet to assume American seeds will be in demand. From a sound economic standpoint, seeds are the best agricultural commodity we can export to many countries. We can export high-quality seeds to all parts of the world, for they are concentrated in value and of sufficient worth to foreign farmers to enable them to pay the prices we must charge.

All this, of course, is a question of the future. Our immediate task is that of shipping all the quantities of both good food and seed which we possibly can, wherever United Nations' fighters are in need of it. Our seeds will move in behind Allied armies of occupation—as they are now moving into North Africa—and help na-

tive populations resume production of their own food. Nazi armies, as they overran country after country, seized whatever food they could find and confiscated seed stocks. What seed they did not steal has often had to be used for food to keep families alive, leaving no seed for the next year's planting. Our offer of seeds to these starving Frenchmen, Greeks, Poles, and other conquered peoples is now standing. We'll deliver as soon as our armies, with the help of patriots of these countries, succeed in clearing Axis armies from each area.

We're building a huge revolving stockpile of seeds, part of which is stored in port cities ready for instant shipment. These seeds are the ammunition for one of the most potent weapons of war—a weapon which will help Europeans decide to turn upon their Nazi captors. That weapon is our promise to sow seeds of corn, wheat, alfalfa, tomatoes, carrots and beets in European soil—where the Nazis sowed no seeds save those of hatred.

More Milkings — More Milk

Most any cow will produce more milk if she is milked three times a day instead of only twice. The amount of increase will vary with the cow, the kind and amount of feed, the number of days of milking three times a day, and perhaps many other factors.

Many investigators have studied the effect of increasing the number of daily milkings; some have reported only a small increase in total milk production, others have reported as much as 65 per cent by milking three times a day. The general opinion seems to be that on the average, an increase of about 10 per cent can be expected by milking three times daily for periods of a month or two, and as much as 20 or 25 per cent by continuing to milk three times daily throughout the entire lactation period.

Cows milked three times a day, however, must be given an increased allowance of grain and other concentrated feeds to provide for the extra milk. It is a good practice to feed such cows three times a day.

Dairy products of all kinds are urgently needed to sustain our civilian workers and fighting forces, and those of our Allies. The milk must come from the cows already at hand. Not until every last cow has been given an opportunity to produce up to the limit of her capacity can it be said that the dairy industry has done its utmost to fulfill its responsibilities.—*DHIA Letter*

Reprinted by permission from the California Cultivator, Los Angeles, Cal.

Cow Cafeteria Aids Plant Breeder in Evaluating New Grasses

Condensed from Certified Milk

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Cooperative Investigations of the Division of Forage Crops and Diseases, Bureau of Plant Industry, U. S. Department of Agriculture, The Georgia Coastal Plain Experiment Station and the Georgia Experiment Station, at Tifton, Georgia

COWS, like humans, respond favorably to the cafeteria style of eating and show a decided and sometimes unexpected preference for certain feeds placed at their disposal. This selective ability of cows and other animals is now being utilized by forage research workers in their search for better pasture plants.

Modern dairymen recognize that good pastures make for economical milk production. They know that some pastures are worth much more than others and that even the best pastures are of little value when the grasses are mature and dry. The principal factors that must be considered in the evaluation of a pasture are yield, nutritive value and palatability. The dairymen, perhaps more than other livestock men, place much emphasis upon another factor, the seasonal distribution of the feed, for it is important that they have good pastures of fairly uniform quality during as much of the year as possible. Any management practice or combination of plants that will supply greater yields of palatable, nutritious pasturage and extend the grazing period will soon be adopted by progressive dairymen. Fertilizer will generally increase the yield, nutritive value and palatability of pastures and its use by dairymen to increase their pasture production is widespread. Recently the services of the plant breeder have been enlisted to assist in solving their feed problems.

Although the plant breeder recognizes that the response of the animal consuming the plant is the best measure of its true value, he soon discovers that the cost of such tests limits them to very few of the most promising plants. Searching for more economical tests he has found that he can measure the total and seasonal productivity of a number of different species or strains of pasture plants by clipping them to simulate grazing and determining

Reprinted by permission from Certified Milk, New York City, Feb., 1943

the yield of these clippings per unit area of ground surface occupied. The analytical chemist can analyze the various constituents in these clippings and thus furnish an index of their relative nutritive value. The scale and test tube are of little value, however, in measuring the palatability of each species. Only the animal that will ultimately use the plant can throw much light on this important question.

Recognizing the importance of the palatability of feed plants, particularly for dairy cows where the maximum food consumption is desired, research workers have developed the cow cafeteria. This cafeteria usually consists of one or more plots of each pasture species planted at random and enclosed together within one fence. Palatability information is obtained by allowing a number of animals to graze these plots at will. The amount of forage removed from each plot has been used as an index of the relative palatability of each species. Perhaps a better technique is based on the rather well proven hypothesis that as long as there is an abundance of feed on all plots the animals will graze longest on the most palatable ones. In this method the distribution of the animals on each plot is recorded at regular intervals, usually one to five minutes. The period when valuable observations may be made usually extends from thirty minutes to an hour after the animals are turned into the cafeteria. A total of the records taken at regular intervals for a number of these grazing periods furnishes a good index of the relative palatability of the different plants in the test, the more palatable species having had the greater number of animals grazing upon them. This technique has been employed at the Georgia Coastal Plain Experiment Station, Tifton, Georgia, and other experiment stations to measure the relative palatability of different strains and species of pasture plants.

The cow cafeteria at Tifton, Ga., has provided much interesting and valuable information. In 1938 the relative palability of Bermuda grass and a new species, woolly finger grass, was measured. Most of the 21 cows used in this test grazed both grasses but for the nine day grazing period showed a distinct preference for the woolly finger grass. One cow, however, developed a special taste for woolly finger grass. As a result, she sought out the woolly finger grass plots as soon as she was turned into the cafeteria and grazed them continuously until driven from the area. This observation, together with others made here and elsewhere demonstrate that cows, like men, do not agree in their choice of foods.

Pearl or Cattail millet is widely

used in the lower Coastal Plain of the Southeast as a temporary grazing crop. When it is grown in a cafeteria with Sudan grass, cows graze it little until the Sudan is gone, demonstrating that it is less palatable than Sudan grass. Consequently, one of the objectives in the breeding program has been the development of more palatable strains. In 1940 four different strains of Pearl millet were planted in ¼-acre replicated plots in a 3-acre cafeteria. The distribution of 38 dairy cows on these strains were observed at three different grazing periods during the summer. The relative cow distribution figures for these strains in 1940 were 100.0, 82.4, 71.5 and 63.2. Statistical analyses of the data proved the differences to be highly significant. One of the most interesting features of this test was the discovery that the finest stemmed strain was the least palatable, a result quite contrary to the opinion of most people.

Out of the Bermuda grass breeding program at the Coastal Plain Experiment Station has come a number of tall growing, rather coarse strains that have greatly outyielded common Bermuda grass in clipping tests. T. S. Boggess, chemist, analyzed clippings from these strains and common Bermuda grown under comparable conditions and found that they were similar in chemical composition. These studies indicated that if these new strains were as palatable as common Bermuda grass, they would be far superior because of their greater productivity. In an effort to solve this problem a cafeteria was planted to duplicate plots of common Bermuda and eight of these strains in 1941. The dairy herd grazing these strains in 1942 showed no decided preference for any one strain. These results indicate that the strains used in this cafeteria do not differ significantly in palatability and that the new strains, because of their greater productivity, are superior to common Bermuda grass.

The cow cafeteria does not always give a true picture of the value of a pasture plant. Sweetclover, for example, is an excellent pasture plant but usually receives a low rating in cafeteria tests because the cows must acquire a liking for its peculiar taste. In spite of its limitations, however, the cow cafeteria appears to be the most effective economical method of determining that highly important characteristic, the palatability of a pasture plant and it will probably enjoy much greater use as the plant breeder finds himself faced with the problem of evaluating many new strains of grass.

How the Office of Experiment Stations Helps Farmers

Howard Lawton Knight

Editor, Experiment Station Record

THE Office of Experiment Stations helps farmers chiefly by helping their State experiment stations. Although the Office is one of the oldest subdivisions of the U. S. Department of Agriculture, its work is less widely known than that of some newer agencies, and this is largely because most of its contacts with the public are indirect. It was set up in 1888 to represent the Department in the administration of Federal agents to the State agricultural experiment stations. Various other duties have been assigned from time to time, but this is still its major activity. Late in 1941 it became part of the Agricultural Research Administration.

The Hatch Act of 1887, so-called because sponsored by Congressman W. H. Hatch, of Missouri, authorized annual appropriations of $15,000 of Federal funds to each State and Territory to establish and maintain agricultural experiment stations. Subsequently, additional Federal aid was granted by the Adams Act of 1906, the Purnell Act of 1925, and the Bankhead-Jones Act of 1935. In 1942 the total received from the Federal Government under these acts and supplementary legislation was $6,926,208. The stations also received from non-Federal sources $15,573,195, so that their total income in that year was over $22,000,000.

Each State cooperates with the Federal Government in maintaining an agricultural experiment station under the Federal-grant acts, and two States have two such stations. Alaska, Hawaii, and Puerto Rico also participate in allotments of Federal funds, making a total of 53 such stations conducting research in agriculture and rural life.

In serving as the Department's representative, the Office cooperates with the stations in planning research problems under the Federal-grant funds, examines their work and expenditures, and helps to coordinate the research work of the Department with that of the stations.

Most of the problems investigated by the stations have their origin in the experiences and needs of farmers. Such problems as those relating to the outbreak

of a new disease, the need for improved varieties of crops and breeds of livestock, for better marketing practices, or for information contributing to better nutrition are brought to the stations for solution. If the station has the staff and facilities for undertaking the problem, it may draw up and submit to the Office a plan for attacking it involving use of the Federal funds. The plan is reviewed by the Office as to previous and current work along similar lines and method of attack. Suggestions are made as to possible improvements and as to coordination with other State or Department studies to avoid duplication and take full advantage of other work. When agreement is reached the project is approved and the study begun. Representatives of the Office visit the station each year to learn at first hand of progress and results under the Federal-fund projects, to offer suggestions for future work, and to examine expenditures as to provisions of the Federal acts and needs of the separate projects.

In large-scale problems lying beyond the scope of individual States the Office may cooperate with bureaus of the Department and the stations by groups in working out arrangements for the study of local or State aspects needed to provide information for regional or national use.

The Office also has responsibility for the direct management of the Federal experiment station established in 1901 at Mayaguez, Puerto Rico. This station serves primarily as an outpost of the Department in the Tropics for the solution of problems in the field of tropical agriculture which are primarily of concern to the continental United States. The Puerto Rico Station likewise is serving the program of western hemispheric solidarity through investigations directed to the possibilities of greater self-sufficiency in the production of certain strategic products.

In the early days the principal work of the Office was the organization and development of its publications. With a view to making a popular record of the results of work at the stations for general distribution among the farmers of the country, a series of farmers' bulletins was begun in 1889. These bulletins proved so successful that their scope was enlarged and they were adopted as a general series of the Department.

To take care of more technical needs a periodical abstract journal, *Experiment Station Record,* was also begun in 1889 and since continued without interruption. The *Record* is now issued monthly and distributed chiefly to libraries, educational and research institutions, and similar public service agencies. Its pur-

pose is to bring together systematically and in small space the principal findings in agriculture and home economice of the experiment stations, the Department, and other research agencies. Each year it compresses into 1,800 printed pages and about 7,000 abstracts what these institutions have learned and published in articles widely scattered and aggregating hundreds of thousands of pages. The *Record* is widely recognized as a standard guide to and a compendium of this voluminous literature. It is of special value to workers in the experiment stations, since it enables them to learn readily what others have already accomplished on a given problem. This decreases the possibility of duplication of work, and of even greater importance it gains valuable time in bringing about a final solution.

In recent years the Office has greatly increased its service to the stations by personal contacts through a small corps of subject-matter specialists. These specialists not only are available for advice on individual problems of organization and attack but also assist in the coordination of work between institutions and the arrangement of cooperation and otherwise promote the efficiency of the experimentation.

These services are helpful at all times, but especially under emergency conditions such as have had to be met in the past 2 years. During this period the Office has actively assisted in readjustments whereby nearly 50 percent of the station projects were replaced by new work on problems of immediate significance or revised or redirected to meet war needs. Much help was also rendered in obtaining prompt cooperation of the technical staffs in the stations in meeting national questions. Among the projects in which the Office participated in securing information from these institutions were an appraisal and judgment as to national farm-machinery needs for 1943, the functional requirements of farm structures, fertilizer problems affecting both manufacturers and consumers, and the possibilities of domestic production of strategic materials, especially rubber.

The Office has served as a coordinating agency in the planning and prosecution of regional and national cooperative research projects, such as studies of the adequacy of butter as handled in the usual trade channels as a uniform source of supply of vitamin A. Another project, including at least 33 States, dealt with the conservation of the nutritive value of foods and their processing, marketing, storage, and cookery for home preparation. Among other informational and advisory services were a compilation on research of the stations in human

and animal nutrition for use by the Interdepartmental Committee on Health and Welfare as Related to Defense; participation in assembling suggested sources of agricultural research information which might be of service to Great Britain and other allied countries; and participation in the organization and work of war service committees of national scientific organizations. All these things have contributed greatly to the effectiveness of the war program.

A recent appraisal by a nongovernmental agency, the American Farm Bureau Federation, declares that "during the past 75 years we have developed the most efficient agriculture the world has ever known. Our land-grant collegs, experiment stations, and their extension services have been the greatest single factor in this development. In our opinion this has been made possible through the democratic method by which they were organized, giving proper emphasis to National, State, and county responsibility, thereby insuring their close association with farmers and their needs and the development of programs to meet these needs."

The Office of Experiment Stations is an integral part of this democratic system. Although its services to farmers are largely indirect, they are nevertheless substantial and of unique value.

Hershey

Also known as proso, broom corn, and hog millet, this crop has experienced several booms in the Plains States as something new, or a bonanza. The best-yielding variety is Turghai. Yields of 50 bushels per acre are not uncommon on summer-fallowed ground. It fits best on sandy ground which is to be used for winter wheat the following year, and as a catch-crop after winter wheat or corn that has failed. Requiring about 65 days to mature, it should not be planted until the ground is fairly warm. The seed should be ground for feeding, and may be used up to 30 percent in poultry rations and as high as 75 percent for feeding cattle if combined with corn or dried beet pulp. For hogs it rates about 90 percent the value of No. 2 corn, and is about equal to barley.

—*Successful Farming*

When Grubs Get After Your Jerseys

Condensed from The Jersey Bulletin

R. C. Jones and M. P. Jones

U. S. Department of Agriculture

EVERY year cattle grubs in this country "chew" holes in hides and thus ruin enough potential leather for the soles of 30 million pairs of shoes. This is a serious loss when our fighting and civilian armies must be kept well shod for high efficiency. In addition, these same grubs rob the milk pail of an undetermined, but considerable, amount of milk which is now sorely needed. Besides these losses, 2 to 3 pounds of jellied meat must be trimmed from the loins of the carcass of every grubby animal slaughtered —another loss of strategic food.

Fortunately these losses can be largely prevented. The grub menace can be greatly reduced and perhaps eliminated. All it takes is concerted and community action by all cattle owners to destroy the grubs shortly before they would emerge naturally from the backs of the cattle. This is the vulnerable period in the life cycle of the heel fly, or parent of the cattle grub. If no grubs are allowed to emerge alive from the animals, there will be no heel flies the next year to produce more grubs.

The time to start is about 3 weeks after the first grubs appear in the animals' backs. The time will vary in the different states, according to geographical location. In the South it may be in November or early December, while in the North it may be as late as February or March.

Hand Extraction—During the present emergency, farmers with only a few cattle would do well to squeeze the grubs out by hand or remove them with forceps. Care should be taken not to break the cyst and allow the grub to slip back under the skin. Details on this method are given in Farmers' Bulletin 1596, "Cattle Grubs or Heel Flies with Suggestions for Their Control."

Oil Can with Benzol — Commercial benzol applied with a common oil can has been found satisfactory for killing cattle grubs. The can should have a very small spout so that it can be inserted in the grub holes. About 20 drops of benzol is the desired amount to inject in each grub hole. This is the least amount you could inject with an oil can with one squeeze.

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Iodoform Ointment Applied by Hand—The usual practice in applying ointment is to locate the grub hole in the animal's back with one finger, and with the next finger press the ointment into the hole. To make the ointment, mix 1 pound of iodoform with 5 pounds of petrolatum, or ordinary petroleum jelly. These materials can be obtained at most any drug store.

Fine-ground roots of cube or of derris, and also other rotenone-bearing powders, are the most satisfactory materials to use in the control of cattle grubs. However, both cube and derris are imported, and the present supply is short. Cube and derris may be used in either liquid or powder form and, except in the Northern areas where the coat of hair of the cattle is extremely dense, the powder will give as good results as the liquid. The best method to use in applying the powder or liquid will depend on the number of cattle to be treated, the equipment available, and other local conditions.

Dusting method (Cube or Derris) — Dusting equal parts by weight of sulfur and cube or derris powder on the backs of cattle and gently rubbing this in with the hand has given good control, except where the coat of hair is too dense. One pound of the dust will treat about 15 cattle. It is best applied from a container with ¼-inch holes in the lid. If the holes are made with a 20-penny nail or similar object, they should be made from the inside so that the ragged edge will not prevent easy flow of dust. Smaller holes will necessitate more shaking and cause a cloud of dust which will be irritating to the operator.

Scrubbing method (Cube or Derris)— The formula for making materials for scrubbing is as follows: Water, 1 gallon; Cube or Derris (5 per cent Rotenone), 12 ounces; either soap 2 ounces or wettable sulfur 6 ounces.

This formula is based on powders containing 5 per cent of rotenone. In case it is necessary to use a product containing more or less than 5 per cent, adjustments should be made.

To mix, dissolve the soap in warm, soft water; then add a small amount of the soapy water to the powder, and make it into a paste; then add the remainder of the water and stir well.

If sulfur is used, mix the powder and sulfur together; then add water slowly, making the mixture into a paste before adding all the water. It is better to use sulfur if the water is hard, because soap causes the material to clot and to settle, thus reducing its effectiveness. This amount is sufficient to treat from 12 to 16 cattle, depending on the length and thickness

of the hair, and the size of the cattle.

The least expensive equipment for applying the liquid mixtures to the backs of cattle is a screw-top fruit jar and a scrub brush. From the outside of the jar lid, punch about 20 holes with a 16-penny nail. Remove about every other tuft of bristles from a stiff-bristled scrub brush. While scrubbing the cow's back with the brush in one hand, continue to sprinkle on the solution from the jar with the other hand. Continue this operation until the solution has been worked through the hair onto the skin everywhere that the grubs occur. Each quart of liquid should treat about three animals. If properly done, the scrubbing will loosen the scab over each grub and allow the rotenone suspension to penetrate sufficiently to kill the pest. Most of the dead grubs will eventually be cast out through the opening and the opening will gradually heal over with scar tissue.

Owners of large herds who have power-spraying machinery will save time and material by using this method. A different formula is used which may be obtained from your county agent. He can also supply you with more detailed information on the entire problem.

Something New in Plant Growing

Condensed from The Michigan Farmer

Keith C. Barrows and Spencer B. Apple

Michigan State College

SOME time has elapsed since anything really new in plant growing technique has been suggested. Here is an idea which is not only new but cheap. No vital war materials are required except a few nails. Where extra earliness is of secondary importance, but where direct seeding does not produce a crop sufficiently early, this method really works. Heat for growth comes entirely from the sun, but additional heat for protection against spring frosts comes from the sides of the bed itself made of manure held in place by a cheap framework.

We've grown excellent tomato plants for a canning crop at a cost no greater than that paid for southern plants, and minus all the uncertainties. We've com-

Reprinted by permission from The Michigan Farmer, Feb. 6, 1943

pared these home grown plants with southern stock, and in our experimental plots they produced over 50% more marketable tomatoes. This greater yield is partly due to a better stand, but also to the fact that home grown plants get off to a quicker start.

So much for the results: now for the method itself. The principle involved is to sow the seed in the ground, preferably in a sheltered location on light soil that warms up quickly in the spring. Low lying heavy soils are unsatisfactory particularly in a wet spring. Surrounding this bed a framework is constructed of stakes and lath with one board along the top. The sole purpose of the framework is to hold up a bank of manure surrounding the bed and to support a muslin cover.

This is how we make it. Parallel rows of stakes 6 feet apart are driven in the ground with the stakes at intervals of about 45 inches. Boards 6 inches wide are nailed along the top. The bed should be somewhat higher on the north or west side than on the south or east. A height of 24 or 30 inches seems to be satisfactory for the taller side or back and 18 to 24 inches for the front. Four-foot lath are then nailed to the stakes with 3 along the back and 2 along the front. The ends of the bed should be sloped to connect the front and back. Manure is then stacked along the outside of this frame. Fresh manure that is not too strawy will give off considerable heat if kept moist; however, any manure will serve the purpose as far as insulation is concerned.

A continuous piece of 81-inch unbleached muslin sheeting is fastened along the back side of the top boards with lath. Each lath is nailed in about 3 places. When the bed is to be covered the sheeting is drawn tightly over the front and fastened down in the same manner. Two persons can best perform this operation. It's a good plan to have a pile of straw handy to spread over the muslin cover in case of an especially cold night after the seedlings have emerged.

For growing canning tomatoes one should sow seed in the frame about 6 weeks before plant-setting time. Seed should be planted in rows 5 inches to 6 inches apart. If they are to be sown with a hand drill it is most convenient to run the rows lengthwise of the bed and leave the ends of the bed open until after the seeding is completed. If planted by hand, rows may run crosswise of the bed. By using a broad board on which to kneel, a furrow can be marked along its edge and the seeds dropped by hand. For stocky development the plants should stand no closer than 1 inch apart in the row after thinning.

Thinning may be done any time after the first true leaves begin to develop, and a careful weeding at this time is desirable. It's a good precaution to dust the seed with some protectant such as cuprous oxide before sowing in order to reduce seed decay and pre-emergence damping-off. Spraying of the plants in the bed for the control of leaf diseases will frequently prove beneficial.

It is desirable to cover the bed as soon as sowing is completed, but after emergence the cloth may be folded or rolled along the back side except during cold weather. By exposure much of the time to direct sunlight stocky plants will develop that are in an excellent condition in which to withstand the shock of transplanting. The manure may be forked away and the framework taken down before digging the plants.

If rows are spaced 5 inches apart one can conveniently place 12 rows in a 6-foot frame without planting too close to the south side which is somewhat shaded. It is well to leave enough space in the front in which one can walk without stepping on the plants. At this spacing of rows and with plants on an average of one-inch apart, 144 plants per linear foot of bed can be grown. At this rate it would take 17 linear feet of bed per acre of tomatoes at the usual field spacing for a canning crop. One should plan to construct 20 feet of bed per acre for a reasonable margin of safety.

If one purchases all the materials needed and charges the entire cost against one year's operation the outlay would not be in excess of that required for the purchase of southern plants. Scrap materials may be used throughout. We bought new 81-inch muslin sheeting long enough to cover the bed. The cloth should be good for 3 years if removed from the frame as soon as it is no longer needed and properly stored.

Second-early cabbage, head lettuce or other hardy vegetables may be started in a similar bed just as early as the soil can be worked. By mulching a sheltered spot in the fall to prevent freezing of the soil a bed can be prepared for these hardy crops even before the snow and ice of winter have disappeared. The method should prove of value in the south where there is sufficient heat during winter for growth of early plants but where occasional cold spells do considerable damage if protection is not provided.

Will Your Seed Grow This Year?

Condensed from The Farmer

SEED testing, cleaning and treating are MUST jobs before 1943 seeding gets under way. They are made necessary by the fact that much of the seed already tested is showing poor germination, heavy disease infection, and a high percentage of weed seed, and light, chaffy grain. All this was to be expected because of heavy weed growth in 1942, and because so much grain was damaged by rain before it could be threshed.

An example of what is being found in state seed laboratory tests comes from the South Dakota State Seed Laboratory where E. L. Erickson and his assistants ran tests on scores of samples sent to the laboratory, and samples taken at random from farms. Percentage figures given are averages of seed lots which germinated below 80%:

Wheat, 33%; barley, 26%; rye, 33%; flax, 18%; sudan, 66%; soybeans, 80%; brome grass, 15%; crested wheatgrass, 11%; sorghum, 90%, and corn, 41%. None of the oats germinated less than 80%. Tests on soy beans in the Minnesota State Seed Laboratory this year show an average of only 61% germination while a year ago the average was 91%, and the 1940-41 average was 89%.

Because of the great need for testing this year, state laboratories are likely to have more work than they can do at times, thus causing delay in making reports to farmers. Therefore there will be need for more than usual home testing.

But whether the seed is to be tested at home or sent to a state laboratory the job of first importance is getting a representative sample of the seed to be tested. If the seed is in a bin or pile handfuls should be taken from at least seven places. They should come from the surface as well as from the inside of the pile, and at least one should come from as near the center of the pile as possible. These should be put in a clean container, thoroughly mixed, and a small portion taken for the test lot to be sent to the state laboratory or to be tested at home. If it is to go to the state laboratory, there should be a pint sample, and, of course, the sender's name and address should be placed on the outside of the sample container.

A modification of the old rag

Reprinted by permission from The Farmer, S. F. & H., St. Paul, Minn., Feb. 20, 1943

doll corn test is an easy method for home testing. Here is the step by step procedure:

1. Scatter a small quantity of seed on a table. Take two 100-seed samples at random. Don't make an effort to separate obviously poor seed from good seed because if that is done the test won't be representative.

2. Place a thoroughly soaked newspaper or paper towel on a sheet of wax paper. Put each of the two samples on separate sheets of such wet newspaper or wet towels, placing the seed about an inch apart in rows an inch apart. Then place another soaked newspaper or paper towel over the seed and roll it up.

If several lots of different kinds of seed are to be tested, several rolls may be wrapped together and the whole lot placed in a covered pail, and the pail placed where it will not freeze and where the rolls will not dry out. The rolls should be examined daily to make sure they are not becoming too dry and if they do appear to be getting dry, water should be sprinkled over the roll. Do not place the pail near a stove since a 65 to 70 degrees temperature is better for all seed except corn and soybeans.

Each 100-seed lot should be read separately. Variation between the two lots should not exceed 12%. If it does another test should be run. Average germination of most field seeds is 85%. If your tests show germination below 70% it would be wise to buy better seed.

Mold on seed and seedlings is indicative of seed-borne diseases. Such diseases develop as the seed germinates, and may kill the seedling before it emerges from the ground, or, such diseases as the smuts will affect the plant when it is near maturity. Treatment which destroys these seed-borne diseases are therefore highly important, particularly this year.

Many elevators are equipped to clean and treat seed and do the work at small cost. If there isn't a nearby elevator thus equipped, treating may be done at home.

Clean Out the Rats!

Condensed from Farm Science Reporter

Harold Gunderson

ARE you paying room and board for 5,000 rats? Are you losing $10,000 down rat holes each year? Some farmers lose this much and are not even aware of it. Rats are so secretive that you will be surprised at the amount of damage they are doing on your farm—here is a quick way to estimate it.

If you never see rats, but see signs of rats and rat damage, there are from 1 to 100 rats on your farm. If you do see rats occasionally at night, there are from 100 to 500 rats. If you see rats every night and a few occasionally in the daytime, you are boarding from 500 to 1,000 rats. If you see lots of rats at night and several every day, you probably have 1,000 to 5,000 rats.

Now then, with each rat costing you fully $2 each year for living expenses, you can easily determine just how big a hotel bill you are paying.

Rats do a terrific amount of damage on the average farm. Because of this waste, rat control will play an important part in our war effort. Three rats eat as much as two laying hens. One hundred rats will eat 100 bushels of corn, and they will destroy and contaminate an additional 300 bushels each year. Rats undermine and destroy foundations and feedfloors. They chew holes in crib roofs and crib slats. And they also give hogs a serious disease—trichinosis.

All of this sabotage continues unchecked on most farms, even in the face of the national war emergency, which calls for highly increased production of feed and livestock and at the same time curtails the construction of farm buildings. In any case it will pay each individual farmer to control rats.

Many farmers refuse to believe that rats are bleeding their pocketbooks because they have seen only a few signs of rats or because they have seen only one or two at night. Actually rats very rarely venture from their nests except at night and are very shy of humans. In fact, you won't see a rat at all unless it is forced out of its home by sheer pressure of high population.

Rat control, in the minds of too many people, is a minor job that needs to be done only once or at most twice during the year. But a good job calls for constant alertness, continual planning and peri-

Reprinted by permission from the Farm Science Reporter, Ames, Iowa, Jan., 1943

odic slaughter of rats. In general, best results are obtained during the fall and spring months. In late fall the rats move into your farm buildings for their winter quarters and will be on hand when you get ready to poison them. In the spring, when the breeding season begins, rats are hungry for any kind of food, and thus are very susceptible to baiting. Effective control during summer and winter months will call for a little more skill and painstaking care, but the results can be just as good.

The first thing to do in rat control is to take a rat census. This can be done roughly through observation, as has already been outlined. On the basis of this census you can start prebaiting—that is, putting out unpoisoned meat or fish. This is the most important step in rat control. In prebaiting, always assume that you are feeding the highest figure in the census range your farm falls into. If you never see rats but have some damage, prebait for 100 rats by distributing 1 pound of meat or fish. Always pick up the uneaten baits the next morning.

Prebaiting serves several purposes. First, it accustoms rats to the food. Second, it tells you where the rats are congregated. Third, it gives you some idea of how many you have. The meat should be ground, rolled into small baits and distributed around your buildings, both inside and out. Its a good idea to practice up for the big day of poisoning by shutting up all livestock during the prebaiting period. One night of this will show you how many chickens can remain on the loose after the avenge roundup. If these chickens are loose the night you poison, they might be dead the next morning — so don't take chances.

Let's assume that your prebaiting is under way and that you discover from it that your chicken house is literally teeming with rats. You certainly won't want to poison around the hen house if you can help it, so you will have to drive the rats to some other shelter. First move the chickens to another yard, and then gas all rat burrows thoroughly with calcium cyanide or car exhaust gas. Then fill up all of the rat excavations with dirt and spray or sprinkle the surface of the ground around the chicken house with creosote oil. Use plenty of creosote and see to it that the foot of ground next to the wall is well soaked. Rats don't like creosote and will leave this area if there are no other hiding places in the immediate vicinity.

Pile all lumber, fenceposts, wagon boxes and other farmyard objects on sawhorses 18 inches to 2 feet off the ground to destroy all possible rat hideouts. Clean up

the empty cans, scrap metal and other junk around the yard. Make the rats find new homes. See to it that chicken feed and livestock feed are not available to them at any time. Over a period of 3 to 5 days you are, therefore, concentrating the rats into a few colonies where they can be poisoned more easily.

Don't use too much cyanide, and don't shoot too frequently at rats during this period or you may actually drive most of the rats away from your buildings for a short time. Your purpose is to get rid, permanently, of as many of them as you can.

Now comes the big day— you are all set to slaughter your rats. You have found through prebaiting that the rats on your farm will eat about 10 pounds of ground meat every night and that they are concentrated in and around the corncrib. So you mix 10 pounds of meat and 2 pounds of barium carbonate together thoroughly and make 1,200 individual baits, each about ¾ inch in diameter. Next you round up and pen safely all of your livestock and pets because barium carbonate is poisonous to all animals, and we don't want any accidents.

Twilight comes, and the rats are hungry. You quickly distribute the 1,200 baits — enough baits so that each rat can eat at least one without fighting off his neighbors. Each bait contains enough poison so that if the rat eats only half of it, he will die. When the baits are distributed, leave the area and don't come back until morning. You don't want to scare or disturb the rats before they have eaten their fill. If you do, most of the rats will just get sick, hide out for a few days and then be back as strong as ever.

Early the next morning go out and pick up all uneaten baits. Don't be surprised if there seem to be quite a lot of them left. Remember that a rat with a stomach-ache can't eat as much as one that is in good health.

Since barium carbonate is a slow-acting poison, you probably won't find a large number of dead rats the first day. But you will pick up dead ones for a week after the poisoning. These should be buried where no other animal can get at them. Probably less than 50 percent of the rats will die in the open, so the odor may be a trifle unpleasant for a few days. But your farm will be quieter than it has been for a long time.

You are still a long way from finished with rat control. Now you should start repairing foundations, closing rat holes and burrows around all your buildings, gassing in favorable places with cyanide or car exhaust gas, and shooting stray rats. The first bait-

ing can be expected to kill from 50 percent to 90 percent of the rats on the farm. So there is still some work left to do.

About 10 days after the first poisoning, start prebaiting again. Use a different bait this time. If you first baited with ground meat, bait with ground fish now. Prebait for at least three nights and then poison them again. Since barium carbonate is tasteless and odorless, you can use it again, but best results will probably be obtained by using a different poison. Red squill is good if you can obtain the full strength, pure powder. It is poisonous only to rats, but it is still a good idea to lock up the livestock.

A third baiting is sometimes necessary, especially on heavily infested farms. Prebaiting should be started 10 to 15 days after the second poisoning. Change the bait again since the rats now left on the farm are probably the smartest ones and the hardest to kill.

Once your foundations are repaired and your farmyard is free of junk, lumber piles and garbage, you can keep your farm free of rats by encouraging your dog to seek out and catch stray rats, by occasional shooting and by prebaiting and poisoning spring and fall. Make this practice part of your regular farming routine. You will save money by doing so.

Fence Repairing — With Electricity

Condensed from New England Homestead

IT is important during these days of material shortages, that farmers be able to repair equipment quickly and effectively.

A big aid in repairing or replac- old worn out fences is the electric fence controller. Its use saves many hours of work, thousands of tons of steel and other vital materials needed for war purposes.

As fence wire of all types disappeared from the market during the last six to eight months, thousands of farmers discovered the ease and economy with which old fences could be repaired through the use of electric fencing.

When a woven wire fence becomes torn, ridden down, or pawed out of shape, and no longer affords protection to crops or livestock, one strand of electrically charged barbed wire run along the inside of that fence will prevent further damage and increase its effectiveness as a barrier.

This single strand of wire can be supported by means of extension arms—1″x4″ pieces of wood 10″ to 12″ long are satisfactory for this purpose. These extension

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arms are fastened 36 to 40 inches from the ground on every second or third fence post—extending 6 to 8 inches inside the fence. As in the case of all electric fence installations porcelain insulators must be used on the ends of the extension arms to carry the charged wire.

Important to remember is the fact that the charged wire must be stretched tight enough to prevent it from swinging in the wind and becoming fouled in the old fence.

In many instances the fence posts are rotted off at the ground and provide no structural strength to the fence. When the electric fence is used to repair old fences it is not necessary to replace those fence posts because no great structural strength is required—the fear of "shock" keeps animals from challenging the fence.

When used to repair existing barbed wire fences the benefits of electric fencing are even greater. On a four strand barbed wire fence, for example, one of the wires may be insulated and electrified, this providing an effective barrier.

The other three wires of that fence are no longer needed—they can be removed and used to repair other sections of fence or to enclose new grazing or growing areas. Used as electric fences the wires of the old fence will reach four times as far and do four times the work they did on the old fence.

Most farmers can make these fence repairs or increased fenced areas to meet wartime production requirements without the use of any new vital materials because practically all of them have barbed wire on the farm—either in the form of existing fences or in partially used rolls behind the machine shed, or at the end of fence rows.

Canary Grass

Fields in New York State still in good condition after 70 years' use are reported. On low, wet lands usually left to marsh grass and weeds, Reed Canary Grass produces a good crop of fair-quality hay or pasture. The land must be plowed and well prepared to give it a good start. On fall-plowed land seeding can be done in the spring before frost comes out of the ground. Fall seeding is preferable, since late spring and summer seedings rarely succeed. Four to eight pounds of seed are needed for each acre sown broadcast.

—*Successful Farming*

Milking Machines — Washing and Care

Condensed from Holstein-Friesian World

H. J. Brueckner and H. S. Pringle

Cornell University, in War Emergency Bulletin 33

THE dairy utensil that has not been subjected to heat or to a "sterilizing" solution after proper washing, is one of the chief means by which fresh milk is contaminated with bacteria. The dairy industry has become so disturbed over the improper cleansing of milking machines that drastic actions have been taken by health department and dairy-plant operators. Milking machines are not difficult to clean and to keep clean. Two wash tubs on a bench, or a two-compartment sink, make washing easier than attempting to do the job in a 12-quart pail on the floor. Adequate brushes for the specific make of machine are indispensable, but they need not be elaborate or expensive. Brushes are not so harsh on rubber as are metal cleaning devices. The method of washing machines as here described requires a stall-cock in the milk house.

The construction of milking machines is such that persistent care must be exercised in cleaning them. The following parts require careful attention: teat cups and inflations; claws; rubber tubing; sight-glasses; pails; pail lids; valves; moisture traps or similar parts in pail lids; and vacuum lines.

A number of definite steps are to be followed in the routine cleaning of the milker. These and the directions are the following:

1. *Rinse the milker immediately*

The first, and all-important, rule is: *never let a milking machine get dirty.* Milk does not dirty the milker unless it is allowed to dry on. Rinse the milker with luke-warm or cold water *immediately* after the last cow is milked; not 15 to 20 minutes later or after breakfast. Warm water loosens more milk than does cold water.

Suck from 2 to 3 gallons of warm water through each unit, completely dousing the teat cups up and down and in and out of the water to get an air brushing as well as a water brushing. This removes most of the milk that is left in the machine. Brush, with the rinse water sucked through

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the unit, the inside of the pail, the pail lid, the petcock or valve, and the sight-glass if there is any, and then the outside of the pail. Throw the rinse water away. Follow this procedure for each unit.

2. *Wash the milker thoroughly*

Following the warm - water rinse, suck through the machine at least from 1½ to 2 gallons of hot water (130 degrees to 140 degrees F.) to which has been added 1 ounce (about 1 heaping tablespoonful) of a good dairy washing powder, containing at least 4 per cent of a wetting agent. it is unnecessary to raise and lower the teat cups during the washing operation. Use clean water for each one, as the water must remove the last trace of milk and milkfat from the machine. Empty hot water into one compartment of the sink or into one of the tubs. Wash all adhering dirt, milk, bedding, and the like from the outside of the tubes and the teat cups.

3. *Rinse and "sterilize" the milker*

"Sterilization" is not effective unless the milking-machine parts are first free from all milk and dirt. Old milk and dirt protect the bacteria during "sterilization."

If the teat-cup assembly is to be "sterilized" on a solution rack with chlorine or lye, the assembly is now ready to be hung on the rack. If the assembly is to be "sterilized" by rinsing with chlorine or water at 180 degrees F., the teat-cup assembly is laid aside until the rest of the unit is washed.

Disassemble the pulsator, the moisture trap, the valves, the rubber gaskets, and the like from the pail lid, and wash them with proper brushes in the sink or tub containing the wash water. Wash also the milker pail.

Chlorine or water

The second compartment or tub should contain the chlorine "sterilizing" solution or cold unchlorinated rinse water. After washing the pail and the lid with its various parts, "sterilize" or rinse them in the second tub or compartment. If the milker pail and its parts were rinsed in the cold water only, the lid and its parts may be put into a stripping pail and covered with water at 180 degrees F. or above.

If the teat-cup assembly has been put on a solution rack, scald the milker pail with 180 degrees F. water. If the teat-cup assembly has not been put on a solution rack, assemble the machine and draw at least from 6 to 8 quarts of the chlorine or 180 degrees F. water through the teat-cup assembly and into the pail. Hang the teat-cup assembly so that it will drain and dry and not be exposed to an undue amount of dirt or dust. This is termed *dry storage* of teat-cup assemblies. The pail should be inverted on a rack and

the lid hung so it will dry and remain clean.

Just before the next milking and after the machine is assembled, a pailful of chlorine solution should be sucked through each unit. The chlorine "sterilizing" solution, whether used in a solution rack or merely sucked through a machine for "sterilizing" should contain about 200 p.p.m. (parts of available chlorine per million parts of solution). The directions for diluting the commercial chlorine products usually are given on the container or leaflet attached to the container.

Dairymen who use hot water for "sterilizing" followed with dry storage seem well satisfied with results. Results in some sections of New York State seem so promising that a number of municipal health departments are requesting their producers to use the 180 degrees F. water and dry storage. A good supply of water at 180 degrees F. must be convenient. The rubber parts seem to last longer when dry storage is practiced than when stored from one milking to the next with a solution in the teat-cup assembly.

If a dairyman prefers to use a solution rather than dry storage, a solution rack rather than a crock is preferred. The advantages of the solution rack method of "sterilization" over the crock method are: (1) a new "sterilizing" solution is used each time, with no doubt as to the strength of the solution; in the crock method the solution loses strength during use and on standing from one day to the next. The solution must be tested daily and changed once or twice a week. (2) With the rack method no air pockets form anywhere in the tubes. With the crock method, all air may not be expelled from inside the teat cups and milk tube, air pockets may form in one tube or another and thus prevent the solution from coming in contact with all the inside surfaces.

All chlorine solutions should be stored in the dark or in brown-glass bottles or earthenware jugs. Many chlorine solutions kept in clear-glass bottles lose ¾ or more of their chlorine in 7 days.

Lye

Lye solutions for "sterilizing" teat-cup assemblies are used in many sections of the State. A 0.5-per-cent lye solution is efficient and is as economical as most chlorine "sterilizers." If the lye solution is made according to directions, one is more sure of its concentration after several days than of that of many chlorine solutions.

Lye is not harsh on rubber. The solution causes no pits or cracks in the rubber and no granular deposit on the rubber that may result from the use of some chlorine products. *Lye*

should not be used for "sterilizing" any milk utensils other than the teat-cup assembly.

The 0.5-per-cent lye solution may be made as follow:

Equipment:

1 One-gallon earthenware jug with rubber stopper, *not cork.*
1 One-gallon glass bottle with rubber stopper, *not cork.*
1 Measuring cup, *not aluminum.*

Solution:

Put enough clean, cold water into the earthenware jug to make it ¾ full. Add one 13-ounce can of ordinary household lye and let it dissolve. Completely fill the jug with clean cold water. Mix well. From the stock solution in the jug, take ¾ of a cup, or ¾ of a half pint, and put it into the gallon glass bottle or jug. Completely fill this bottle with clean cold water. Mix thoroughly. The 0.5-per-cent lye solution in the glass bottle or jug is ready to use for "sterilizing" the teat cups, claw, and milk hose of the milking machine.

To clean the vacuum lines, draw a 3-to 4-per-cent lye solution through them from the stall-cocks to the moisture trap just ahead of the pump in the vacuum line. Cleaning these lines about twice a year is a good practice to acquire and is a precaution against possible contamination of the milk from this source. When flushing a pipe line, start at the stall-cock nearest the pump. Draw enough solution through this stall-cock to be sure that the line is clean to the moisture trap. Now skip 1 or 2 stall-cocks and suck more solution through the pipe line. Continue until the stall-cock farthest from the pump has been used. This procedure prevents the line from clogging if it is fairly dirty.

If a milker pail, containing milk and the vacuum being drawn on it, upsets, milk usually gets into the vacuum line. Draw cold water through the pipe line from the stall-cock through which the milk entered or a stall-cock nearer the end of the line immediately after the milking. This saves possible trouble in the next day or two.

Quality in Grasses for Pasture and Hay

Condensed from Better Crops With Plant Food

H. J. Snider

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THE market value of hay, as a rule, is based entirely on external factors, such as freedom of weed contamination, color spoilage, and some others. On this basis one ton of hay, timothy for example, is equal in value to every other ton of hay made from this species of grass. Apparently, the market does not allow a price differential in favor of the possible higher feeding value in hay due to some special soil condition such as a high level of natural fertility or special fertilization, or both of these together.

It has been found by chemical analysis that one ton of Kentucky bluegrass hay from land having rather liberal fertilization contained 365 pounds of protein, while a ton of bluegrass removed from adjoining unfertilized land contained only 162 pounds of protein. Another difference which affected the feeding value of these two samples of hay was the mineral content. The ton of hay from the fertilized land contained 61 pounds of minerals, while the ton from the unfertilized land contained only 37 pounds. These minerals were composed of phosphorus, potassium, calcium, magnesium, iron, and manganese. Minerals such as these have proven of great value in animal nutrition and represent a value in grasses which should not be overlooked. In the bale, these two hay samples would be very much the same in appearance and, according to market standards, might easily be in the same grade and sell at the same price.

The type of soil upon which Kentucky bluegrass grows was found to have an effect upon its feeding value. In 1941 on untreated Ava silt loam soil in Southern Illinois, bluegrass hay was found to contain 144 pounds of protein and 31 pounds of minerals per ton. On Harpster clay loam in Central Illinois, bluegrass hay was found to contain 185 pounds of protein and 45 pounds of minerals per ton. In both these cases the hay was harvested at the same stage of maturity and was from untreated soil.

Association with legumes has an effect on the composition of grasses. On well-fertilized land at Urbana, it was found that redtop grown alone contained 162 pounds

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of protein and 43 pounds of minerals per ton. When redtop was grown with alsike clover, the redtop hay contained 186 pounds of protein and 47 pounds of minerals per ton. In this same set of tests timothy alone was found to contain 118 pounds of protein and 35 pounds of minerals per ton. When grown in association with alsike clover, the timothy hay contained 174 pounds of protein and 44 pounds of minerals per ton. Mixtures of legumes and grasses make an ideal pasture and also excellent hay, but the fact that the grasses are themselves enriched by this association is very significant. In this experiment common white clover was one of the legumes used in the mixtures with the grasses; this clover was among the most effective of the legumes in enriching the associated grasses. This common white clover frequently grows wild in pastures, and its presence should be looked upon as an advantage because it may greatly enrich the grasses both in protein and mineral content.

Reports come from many sections regarding serious injury to livestock which feed too long on grasses and other plants grown on phosphorus-deficient soils so that the animals' diet may be decidedly deficient in phosphorus. Ava silt loam in southern Illinois is decidedly deficient in available phosphorus. Kentucky bluegrass grown on this soil has been found to run as low as 1.5 to 2 pounds of phosphorus per ton of hay. Bluegrass grown on more fertile Illinois soils, untreated, has been found to contain 3 to 4.5 pounds of phosphorus per ton which are increases of 100 to 125 per cent over the Ava soils. Other grasses such as timothy, redtop, and orchard grass have been found to be correspondingly low in phosphorus on the Ava silt loam soil. It is not uncommon to double the phosphorus content of the above-named grasses by the addition of relatively small amounts of super-

Table 1—Composition of Kentucky Bluegrass Hay

Soil Treatment	Hay lbs./A	Pounds per Ton of Air Dry Hay						
		Protein	Phosphorus	Potassium	Calcium	Magnesium	Iron	Manganese
None	860	150	3.2	31.2	6.0	4.4	.20	.59
N	1830	212	3.2	36.4	5.2	4.8	.38	.46
P	1120	161	5.8	32.0	5.1	4.6	.10	.38
NP	1970	226	6.4	37.2	5.2	4.8	.46	.46
NPK	2080	210	6.2	46.2	5.0	4.4	.58	.40

N Ammonium sulphate, 200 pounds annual. K Muriate of potash, 200 pounds annual.
P 0-45-0, 200 pounds annual.

phosphate and other phosphates.

For increasing yield and protein content of grasses and hay, the use of nitrogen fertilizers has been found to be the most effective on Illinois corn-belt soils, although other fertilizing constituents have added to the protein content. On the Clayton experiment field, Table 1, the use of ammonium sulphate at the annual rate of 200 pounds per acre more than doubled the hay yield in pounds an acre and added 62 pounds per ton to the protein content of the hay, which represents a 41 per cent increase over that of the untreated hay.

In this field test, the addition of treble superphosphate (0-45-0) added slightly to the yield and to the protein content of the hay. Apparently, one of the greatest values of the applied phosphate on this soil was to increase the phosphorus content of the hay. In one case, this increase amounted to exactly 100 per cent, which is a considerable amount of phosphorus added to a crop such as Kentucky bluegrass. This soil was not especially deficient in available phosphorus, although the amount found in the soil was relatively low.

Potash applied to the soil gave some increase in yield and a rather large increase in potassium content of the grass. It was found in another experiment that the continued use of large amounts of ammonium sulphate had gradually reduced the amount of available potassium in the soil, and this, consequently, lowered the potassium content of the bluegrass hay. On this soil it is likely that if the use of ammonium sulphate is continued over a number of years, the effectiveness of the applied potash may become more apparent both in the yield and the composition of the grass.

This experiment, Table 1, was on what is known as Harrison silt loam. This untreated soil had a reaction of pH 5.6, and the use of ammonium sulphate after four years had reduced the reaction to pH 5.0.

Total nitrogen content of the untreated soil was 3,600 pounds an acre (two million pounds) which represents a reasonably productive corn-belt soil. The addition of 800 pounds of ammonium sulphate over a period of four years had not altered the total nitrogen content of the soil even in the top three-inch layer. Apparently the grass had fully utilized the amounts of nitrogen applied.

Soluble phosphorus in the untreated soil was found to be 20 pounds an acre, and the addition of superphosphate had greatly increased the amount in the surface layer. At the rate the phosphate was applied during four years, approximately 160 pounds of phosphorus an acre were added.

On the basis of two million pounds, 120 pounds of this were found in a very soluble form in the top three inches of soil. Only a relatively small amount of the phosphorus was found to have passed to the second three-inch layer of soil.

Available potassium was found to be about 200 pounds an acre on untreated soil, which is not a very large reserve. The use of muriate of potash had in four years increased the available potassium in the soil to 240 pounds an acre, which is a relatively small increase. There was no evidence of any considerable accumulation of available potassium below the top three-inch layer of soil. Apparently the grass had utilized a very large part of the applied potassium.

The analytical results indicate that there was a rather large utilization of the applied fertilizers by the bluegrass. It is apparent that only relatively small portions of the applied nitrogen, phosphorus, and potassium passed downward beyond the top three-inch layer of soil. There was small chance that any considerable portion of the plant food passed out of the feeding range of the grass roots. It is apparent also from these results that soluble fertilizers are utilized to a very high degree when added to a rather heavy bluegrass turf.

A Successful Grazing Project

Condensed from The Rural New-Yorker

Buckley Maits

NEW YORK STATE has demonstrated the first successful community grazing experiment since the days of the old New England common. The one hundred and twenty-nine Schuyler and Seneca County farmers who were members of the Hector Grazing Association during 1942 proved that common-use pastures can be as efficient, healthy and safe for livestock as a private farm. This 13,000-acre Federal Government project is toward the southern end of the east shore of Seneca Lake, near the village of Hector. When the Government bought the land six year sago, some of it was tax delinquent. Other tracts were owned by farmers who had found it impossible to make a success of intensive crop farming and wanted to sell out so that they could move elsewhere to better land. Still other holdings supported timber that might some day produce profits if managed carefully. And some of it was just hard-scrabble briar patch, abandoned as a result of

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long years of erosion and hard usage.

The project was started to see if it will be practical and desirable to use such land for community grazing areas. If successful, it would be a demonstration which groups of farmers could try elsewhere, because the land around Hector is typical of many other sections, especially the so-called Southern Tier counties of Central and Western New York.

Although 1942 was not the first year for grazing at Hector, it was the first season that the project has operated on a large enough scale to show whether community grazing would work or not. Its success during 1942 in pasturing as many as 2,700 head of sheep, cattle and horses at one time indicates that this kind of submarginal land has definite production possibilities.

Farmers around Hector were well pleased with the good condition of their animals when they came off the pasture last Fall. They were also pleased with the low price of grazing permits, since they cost only $1.25 a month per head for the best pasture, $1.00 a month for ordinary pasture and 75 cents a month for unimproved pasture. This was the price for full grown cattle. Other livestock was charged accordingly. Members of the Hector Grazing Association decided that five ewes equalled one steer, and that a horse consumed more than a heifer. If the ewes were without lambs, the figure used was seven head to equal one steer.

Results at Hector this year show that development of additional land during the next few years may make it possible to repay interest on the original investment, plus the costs for fencing, liming, seeding and fertilizing, as well as the salaries of a superintendent and three herdsmen.

Membership in the Hector Grazing Association is open to any farmer nearby who needs extra pasture. Once his turn has come to secure a grazing permit, he automatically becomes a member of the association and has a voice along with the other members in determining the rules under which grazing is carried on. The association collects 40 percent of all money paid in for grazing permits and the Government collects 60 percent. Out of the Government's 60 percent, one-fourth is returned to the two counties in lieu of taxes.

The grazing association provides certain services to its members in return for the money it collects. These include veterinary care, disease control, marking of livestock and salting while on pasture. Only mares, colts, steers, unbred heifers, and ewes with or without lambs are admitted to the pastures, but for these the best of

care is provided. Health regulations are observed.

There have been no thefts, very few injuries and practically no disease. Every animal trucked there is ear-tagged, and its peculiarities carefully noted in the record book, by the government superintendent or a herdsman, before it is released to graze. Sheep are paint-branded, and are also dipped for ticks when they first arrive. Every six weeks they are drenched to prevent and control worms. This helps to keep the pasture free from parasitic infestation. The herdsmen also keep a watchful lookout for hoof rot. Water hole approaches are limed to prevent its spread, and wet spots in the pasture are drained by ditching. Any animal that contracts hoof rot despite these safeguards is isolated and treated.

A local veterinarian is on call at all times, and the herdsmen count all stock twice each week, meanwhile inspecting them for any sign of disease or injury. Three herdsmen are on duty every week-day and one on Sunday. One of their duties is to patrol the pastures to prevent theft, and guard against stray dogs or wild animals. They have fired at dogs several times but only one animal, a ewe, was lost and all signs pointed to a bobcat as the guilty marauder.

The project is designated to help the average farmer. That it has done so, is testified by the large number of Schuyler and Seneca County farmers who used the grass this year to piece out scanty pasture land. In many cases, the extra pasture available made it possible for them to devote more of their own land to growing hay for Winter feeding.

Most of the farmers who use the pastures at Hector live less than ten miles away, although one man brought his stock 40 miles. A few of them had trouble hiring trucks to return their stock from Hector last Fall. Many who took out permits for the first time last year also worried about the safety and well-being of their animals for a while and visited the pastures frequently. They often came on week-ends with a basket lunch and an eye out for the welfare of their stock. However, the word was soon passed around to stop worrying because the herdsmen were taking care of things in good fashion.

Since water is just as important as grass for livestock, the Hector Grazing Association and the Government have made a special effort to insure an unfailing supply. Existing springs have been improved and new ones located. Although the past year gave no trouble from drouth, provision has been made to meet dry weather conditions if they occur in the future. Wells are ready for

emergencies, and there is also extra pasture and hay land held in reserve in case some of the pastures burn out in the late Summer. Last year, the grass was lush on nearly all of the pastures for the greater part of the season, due to a moist Spring, and the practice of changing stock from one pasture to another in such a way that the grass was not eaten too closely at any one time. Pastures that showed signs of weediness were promptly mowed. The sheep refused to graze redtop but just as soon as it began to grow rank in a pasture the sheep were taken off in favor of horses, which showed a great liking for that particular plant.

Although pasture is the main business at Hector to date, there are other activities as well. At present, there are 5,200 acres of grass land in 39 different pasture fields. However, only about 1,850 acres are improved; another 1,600 acres are fenced but still unimproved. Some 25 miles of electric fence have been strung around the pastures. In addition to pastures there are four meadows with a total of some 170 acres. Nearly 300 acres were in cultivation during 1942, and also a sizeable piece of land has been reserved for the picnic grove, buildings and barns.

About 4,000 acres of the Hector project are just plain, ordinary, hard-scrabble briar patch which the Government is gradually restoring to forest land. Some 3,200 other acres are covered by existing woodlands. There was not sufficient grass for all the stock that farmers wanted to put on the pastures last year, but this year the Government and the Hector Grazing Association expect that enough pasture improvement work will be under way so that every farmer who applies may have a permit. There were 147 different grazing permits issued to 129 different farmers this year.

No one man is entirely responsible for the success of the Hector project, but there is one man who deserves much credit. He is Lyman O. Bond, the government superintendent. He works for the Soil Conservation Service which has played a major part in developing the project, and is also a Schuyler County farmer, owning a farm just a few miles from Hector. He is of the opinion that Hector will become a local community project that can soon stand on its own feet without Government support.

Electric Brooder Care

Condensed from Electricity on the Farm

J. B. Stere

POULTRYMEN, who have used electric brooders the past five to seven years with consistently satisfactory results, have learned that the secret in obtaining long, useful life lies in the occasional attention that is given by the operator. The three critical periods when attention is most effective and easiest are — (1) while the brooder is in use, (2) at the time it is being stored, and (3) in advance of the time of planned re-use.

Proper attention, given at the time the brooder is being used, will pay greatest dividends and simplify care. For example, keeping the hover free of droppings eliminates the task of cleaning and this precaution also prolongs the life of the hover. Flat hovers may be covered with several layers of paper or two to four inches of litter to protect the brooder. The birds are permitted to use the top of the brooder for additional floor space and, as the droppings collect, the top layer of paper is removed or the litter is changed to facilitate cleaning. Sloped hovers are usually designed to prevent birds from roosting on the brooder. The incline of some, however, is only sufficient to cause birds to slide off when the hover is perfectly clean. Such hovers should be waxed and polished. The birds will keep the hover clean as they slide off.

The extension cord of a brooder should be kept free of litter and so supported that chicks will not use it for a roost. In many cases, the extension cord provides the initial means for birds to soil the hover. Supporting the cord in a vertical position will prevent such trouble.

Adjusting the brooder curtain to keep it out of the litter will prolong its life. Loose ends or ravels that the chick may peck should be securely fastened and cut off short.

An adequately-insulated brooder provides maximum protection against heat loss. In some cases, chicks have destroyed large sections of insulation by pecking. When chicks start pecking insulation, it is an indication that a change in management may be needed. Perhaps the brooder is crowded or the temperature under the brooder may not be high enough to drive the birds out to

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feed during the daytime or, possibly, the light intensity under the brooder is too high. A red attraction light will usually correct the latter condition. Aluminum paint or a tar compound is usually applied to insulating material to repel chick pecking.

The heating element is the heart of an electric brooder. It should be kept free of dust and other foreign matter by brushing lightly with a dry, soft brush about once each week. Avoid rough handling or jarring of the element and never immerse it in water.

If it is desired to discontinue the use of an attraction or pilot light, replace these bulbs with a burned-out bulb. Open bulb receptacles collect dust and create a potential fire hazard. Dust and moisture may also form an acid that will destroy the receptacle.

The fan unit of a forced air-ventilated electric brooder should be given careful attention.

At the end of a brooding period, the brooder should be thoroughly cleaned, disinfected and dried. Remove the wafer and store it in a cool, dry place, such as a basement. High storage temperatures can destroy the effectiveness of a wafer. If possible, set the brooder in sunlight, exposing all parts to direct sun-rays for a period of several hours. Sunlight not only will dry moisture accumulation but helps to sterilize as well. If conditions do not permit sunlight exposure, keep the brooder in a dry, warm room for several hours. Detach the curtain after it is thoroughly dry. The thermometer should also be removed. Place these extra parts in a paper bag or similar wrapping and attach to the brooder. Make a written note of any damaged parts that cannot be repaired so that new parts may be ordered.

A dry room, free of excess dust, and where electric service is available is a desirable storage space for the brooder. Either hoist the brooder to the ceiling or fasten it to the wall to conserve space and avoid damage.

The brooder should be inspected and tested four to five weeks before the chicks arrive. Order new parts that may be needed as early as possible. It may be necessary for your dealer to secure the parts from the manufacturer.

Electrical Connections. Before connecting the brooder to the electric circuit, inspect the electrical connections for mechanical and electrical security. It is not necessary to untape connections unless there are some indications of trouble. Test attraction and pilot-light bulbs in another receptacle so that it will not be necessary to connect the brooder to the circuit as yet.

Thermostat. The thermostat is the "brains" of an electric brooder.

It is connected in the electrical circuit in the same manner as is an ordinary switch. The thermostat is adjusted to shut off the flow of electric current when the desired temperature is attained and to turn on again when the temperature drops. The two general types of thermostat used in electric brooders are — (1) snap - action and (2) slow-action. Either type may be operated by a gas or liquid filled metal wafer that expands when the temperature rises and contracts when the temperature falls, or by a bi-metallic strip that bends with changes of temperature.

The contact points of a snap-action type are usually enclosed in an insulated box and are not open to inspection. The mechanism can be tested by applying and releasing slight pressure to the stem that protrudes from the box. The action of the switch snapping on under pressure and off when released can be heard.

The contact points of a slow-action thermostat should be inspected for pits or burns. These can be removed by polishing with a small carborundum stone or file. This type of thermostat is usually equipped with a small condenser to reduce arcing and prevent radio interference.

When the brooder in not in use, the thermostat wafer should be removed and stored in a cool, dry place, such as the basement. To test the wafer, hold it between the thumb and forefinger and immerse in a pan of cool water, then in a pan of warm water. If the wafer is in good operating condition, the expansion and contraction can be felt. Some poultrymen buy new wafers each year, but this is unnecessary if the wafer is properly stored when not in use. Wafers will perform satisfactorily for long periods, if properly stored.

Heating Element. The two common types of elements used in brooders are—(1) open wire and (2) enclosed or sheathed type. In the open type, the resistance wire is exposed to the air while in the enclosed type this wire is in an insulated metal sheath.

Open Wire. Avoid kinking or nicking of the wire as such will create hot spots and thereby shorten the life. Inspect electrical terminals for tightness and cleanliness. If a terminal is found to be loose and, as a result, an inch or so of the resistance wire has been burned, remove this section of wire and make a new connection. Be sure all parts of the new connections are free of oxides and dirt. Do not remove long sections of the wire as this will increase the wattage used, and the heat output and also shorten the life of the element.

Enclosed or Sheathed Type. Avoid rough handling or bending.

Check tightness of electrical terminals. Be careful not to twist terminals as such may rupture the element wire inside the sheath. This condition can seldom be repaired.

After the wafer and pilot light have been replaced, the brooder can be connected to the electric circuit. Adjust the thermostat so the pilot light is on.

Thermometer. The principal use of the thermometer is for making initial adjustment of the thermostat. When chicks are placed under the brooder, the thermostat is adjusted to provide maximum chick comfort, usually between 90° and 95° F. An inaccurate thermometer may be responsible for "getting off to a bad start." Brooder thermometer accuracy can be checked with the aid of a reliable thermometer, such as clinical thermometer, by immersing both in the same pan of lukewarm water for one minute and comparing resultant readings. Avoid jarring the brooder thermometer; to do so may separate the liquid column in the tube, thereby making it an inaccurate instrument.

Brooder Curtain. Brooder curtains are usually made of canvas. The supply of this material is now limited. If a curtain should be irreparably damaged and proper materials are not available from which to make a new one, a feed sack is a fairly satisfactory substitute. The height of a curtain varies with different makes of brooders and, obviously, the length is determined by the size of brooder. They should come to within 1 or 1½ inches of the floor.

Testing the Brooder. After the parts of the brooder have been inspected and the necessary repairs made, place the brooder on a floor free from drafts and connect to the electric circuit. Regulate the thermostat so the pilot-light turns off when a temperature reading of 95° F. is attained. Leave the brooder in operation for at least a day for a good test.

Production Testing as a Basis for Selection

Condensed from Hog Breeder

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SELECTION has long been the principal tool through which man has attempted to bring about the improvement of farm animals. Following the domestication of livestock, which was accomplished long before the beginning of written history, man began to choose certain animals for breeding, while others were slaughtered and eaten. Until very recent times, the only criterion which the breeder had was based upon the general principle of "like begetting like." That this principle has resulted in marked progress is evidenced by a comparison of the livestock of a century or more ago with our present-day animals. Thus, the modern meat type hog of the United States can hardly be compared with its ancestors, the European wild boar (Sus scrofa); the latter being characterized by tusks several inches long, great shoulder development, light hams, and the young born with longitudinal dark stripes on the body which disappeared as the animal matured.

It must also be recognized that effective selection must be based upon characteristics of economic importance. Thus, the ability to travel, to fight, and to withstand hardships was of paramount importance in the 13 head of hogs which Hernando de Soto and his 600 soldiers embarked with at Tampa Bay (now Florida) in year 1539. This hardy herd of scampering pigs, constituting the first swine enterprise in America, must have possessed unusual stamina to have traveled with the energetic Spanish explorer. Their hazardous journey stretched from the Everglades of Florida to the Ozarks of Missouri. Yet, in spite of hardships, the herd thrived so well that at the time of de Soto's death on the upper Mississippi, three years after landing at Tampa, the hog herd had grown to 700.

In contrast to these conditions, present-day swine are selected chiefly for their ability to fatten rapidly and economically, and the pig is recognized as second to none in the economy of American meat production.

There can be little doubt that

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men like Bakewell, Bates, Cruickshank, and other eighteenth century breeders had made a tremendous contribution before Mendel's laws became known to the world in the early part of the twentieth century. These pioneers had certain ideals in mind, and according to their standards, they were able to develop some well-nigh perfect specimens. These men were intensely practical, never overlooking the market requirements. No animal met with their favor unless such favor was earned by meat upon the back, milk in the pail, weight and quality of wool, pounds gained for pounds of feed consumed, or some other performance of practical value. Their ultimate goal was that of furnishing better animals for the market or lowering the cost of production. It must be just so with the master breeders of the present and future. However, with our present knowledge of genetics and physiology of reproduction, progress should now be much more certain and rapid.

The modern breeder knows that the job of transmitting qualities from one generation to the next is performed by the germ cells, a sperm from the male and an egg from the female. All farm animals are the result of the union of two such tiny cells, one from each of its parents. These two germ cells contain all the anatomical, physiological, and psychological characters which the offspring will inherit. More specifically, the determiners of the future animal's various characters are contained in thousands of substances called "genes" which are found in the 40 to 60 chromosomes of each egg and sperm. In the body cells of an animal each of the chromosomes is duplicated, whereas in the formation of sex cells, the egg and the sperm, a reduction division occurs and only one chromosome of each pair goes into the sex cells, so that only half the number of genes that there are in the body cells of the animal go into the egg and sperm.

When mating and fertilization occurs, the duplicate halves of each chromosome from each parent come together, and so the genes are duplicated in the body cells of the embroyo. It is in this way that the characters from the two parents are transmitted to their offspring.

Variation in animals has been described as both the hope and the despair of the livestock breeder. Thus, within a litter of pigs one may observe differences even in the best of the purebreds. There are variations not only in body size and shape, but also in temperament, performance, fertility, and in every conceivable character.

If an animal gets similar determiners or genes from each parent,

it will have a uniform set of offspring because any half of its inheritance which it may transmit to any offspring is just like any other half of its inheritance. Unfortunately, very few of our animals are in this happy hereditary state at the present time. Thus, a parent will sometimes transmit to one offspring much better inheritance than it does to another. This is no more mysterious than the result which would be obtained in drawing a random sample of 50 apples from a barrel containing 70 sound apples and 30 rotten apples. One might get anywhere from 50 apples which were all sound to as many as 30 rotten and only 20 sound apples. Naturally, these represent the extremes, but they could happen. On the average, however, one would expect to get somewhere near 35 sound apples and 15 rotten apples. Because of this situation, the mating of an ideal type boar to an ideal type sow does not necessarily give assurance that all of the offspring will be equally good individuals.

Swine producers have been trying to plan their breeding operations so that their breeding animals not only approach ideal type, but that they may also transmit these same good qualities to all of their offspring. This necessitates a completely pure homozygous animal in which the corresponding genes in the paired chromosomes are exactly similar. With this in mind, let us consider how we can purge our breeds of livestock from the unwanted characters which lower their efficiency of production.

Let us take, for example, the case of hernia in pigs. As the unwanted characters are practically all recessive (hidden), if we mate the young boars which are going to be the herd sires with one or two sows which show the recessive character, hernia, any boar which is heterozygous (possessing corresponding genes in the paired chromosomes which are dissimilar) will give offspring half of which will show the character. Such boars should then be castrated. If however, their offspring from sows with hernia are all normal then we can safely use them in the herd; and while we use such boars in the herd we can be certain that the hernia will never appear.

The pedigree indicates what an individual probably will be, individuality indicates what its outward merit is, but its progeny shows what kind of inheritance it really has and will transmit. The Duroc Jersey boar, "Stilts," and the Poland China boar, "Liberator," great sires of two decades ago, would scarcely have won in a show of Rocky Mountain Goats, and yet both of them are among the immortals because of their progeny. Thus, it is how the animal breeds, rather than

how it looks, which is the important thing.

Since a male produces during his lifetime many more offspring than a female, the progeny test is applied much more widely to males than to females—except in the case of pigs where, because of the large size of litters, the female exerts a larger influence in the next generation than is the case with horses, cattle and sheep.

Progeny testing has been practiced most extensively in dairy-cattle breeding, and in recent years, it has become rather generally accepted as one of the best measures to use in selecting a sire. Sporadic attempts have been made to apply the method to work animals and to those animals used in the production of meat and fibers, with the exception of the swine-breeding work in Denmark, no large-scale projects have been carried out that are comparable to the work with dairy cattle.

In the latter part of the nineteenth century, the Holstein-Friesian Breed Association introduced official weighing of milk and testing for butterfat per cent as a part of their program. Although for a number of years there was serious doubt as to whether this method of performance rating for the dairy cattle breeds would become popular enough to be retained, it, together with its derivative herd testing, is now the most widely known record of performance used in the United States. Inasmuch as the value of dairy animals is largely determined by the quantity of milk and butterfat produced, it is only natural to find that these factors are used as the criteria through which animals are proved. Although type or individuality is not included, it is regarded as important, and is so recorded by the Jersey and Holstein record association when information concerning it is available. As yet, no association has made official testing a prerequisite to registration, but in this connection. it is interesting to note that in the European countries of Holland, Switzerland and Denmark, production records are included as a major part of selective registration.

The breeders of race horses have always followed a program of mating animals of proved performance on the track. It is interesting to note that the first breed register which appeared in 1791, was "An Introduction to the General Stud Book" for the thoroughbred horse. In it were recorded the pedigrees of all the horses winning the important races. In a similar way, the Standardbred horse, which is an American creation, takes its name from the fact that, in its early history, animals were required to trot a mile in two minutes and thirty seconds or pace a mile in two minutes

and twenty-five seconds before they could be considered as eligible for registry. The chief aim, therefore, of the breeders of race horses was to record the pedigrees of outstanding performers rather than all members of the breed.

More recently, poultry breeders have introduced the practice of trapnesting hens as a basis for a record of performance. Advanced registry for poultry is limited to outstanding producers, and it is doubtful if general registration of all eligible animals will be attempted because of the short life and the comparatively small value of individual birds. Production contests are held annually in which a performance rating is based on the production of thirteen pure-bred pullets for a period of one year. These laying contests have gained increasing favor, and now it seems likely that "Production Shows" are destined to replace "Standard of Perfection Shows" based on conformation and fancy points.

In developing a record of performance with meat producing animals (fat stock), the problem is more complicated. This is due to the fact that characteristics of economic importance which must be the basis of effective selection are neither clearly defined nor easily measured. Breeders of dairy cattle have measured the milk and butterfat production of their animals, breeders of race horses have used speed as the criteria, and poultry breeders have used egg production. With sheep, beef cattle and swine, it is more difficult to place a "yardstick" upon the characteristics that should be measured.

Probably the outstanding record of performance with fat stock is the swine breeding work of Denmark. This work was started in 1907, and since then, it has operated continuously, except for three years during World War I when shortage of feed forced the suspension of all testing. In the Danish system, the registration of swine is supervised by a national committee in charge of swine breeding. Only animals bred at organized swine breeding centers are eligible for registration, because those are the farms where the breeders have complied with certain regulations, including sending each year to the testing stations half as many litters as they have sows in their herd. At the testing stations, these test litters of four pigs each are fed under standard conditions, and the rates and economy of gain are recorded. When each pig reaches a weight of two hundred pounds, it is slaughtered at a nearby bacon factory and its dressing percentage and the type, conformation and quality of its carcass are measured and scored. Twice annually each breeding center is inspected by a commit-

tee which scores it for (1) management and general appearance of the farm, (2) conformation of breeding animals, (3) fertility of the breeding animals, (4) efficiency in the use of feed by the test pigs from this center, and (5) slaughter quality of the test pigs. The advances made in the carcass qualities (body length, belly and backfat thickness) plus efficiency of feed utilization have been phenomenal.

A fundamental difference in the attitude of Danish and American swine producers is the greater emphasis placed upon type and attractive appearance of hogs in this country. In Europe, utility considerations are dominant in the selection of breeding stock. This is indicated by the weak, sagging backs and broken-down pasterns of many of the animals of the superior strains of the Landrace breed of hogs. Such defects in form, probably unimportant when hogs are raised in close confinement, are serious faults under the conditions for hog raising in the United States. Moreover, to forget the artistic side of animals tends to take all of the fun out of livestock production for many of us. Then too, it is generally recognized that testing stations, such as found in Denmark, are less practical in the great expanses of these United States.

The effectiveness of selection can be increased providing it is based upon carefully taken records, rather than upon casual observation. Naturally, it would be illogical to expect upstanding, narrow-bodied, shallow sows and boars to beget well-balanced, wide, deep, meat-type barrows that would be market toppers. Breeding animals of acceptable meat type can only transmit these qualities unfailingly to all of their offspring when they have themselves been rendered relatively homozygous or pure for the necessary genes, a process which can be gradually accomplished through judgment by the eye method but which can be made more rapid and certain through securing and intelligently using records of performance. Individual selection is weak because it does not get down to the root of the matter, the genes, but deals rather with appearances and these may be very misleading.

As previously stated, to be effective selection must be based on characteristics that are of economic importance, and to be most effective, a "yardstick" must be placed upon the characteristics that are to be measured. Perhaps the characteristics of greatest economic importance can be enumerated as follows:

1. High vitality and productiveness.

2. Economy of feed utilization.
3. Meeting the market demand.

That swine show variations in these characteristics is generally recognized. The problem is to measure these differences from the standpoint of discovering the most desirable genes and then increasing their concentration, and at the same time, purge the herd of the less desirable characters.

The United States Department of Agriculture and the State Experiment Stations of Iowa and Minnesota have conducted swine investigations similar to the Danish System, namely, obtaining accurate feed records of four pigs from a litter at a central feeding plant and carcass data of three slaughtered pigs. The Minnesota Station reported a difference in feed costs, in gains, and in carcass values of purebred hogs. The average daily gain per pig ranged from 1.10 to 1.64 pounds and feed totals for 100 pounds of gain varied from 354 to 409 pounds, and a difference of $2.00 in the value of a 225 pound hog carcass showed up.

At the present time, a part of the swine registry associations of the United States have a system of progeny testing of sows, designating it as Registry of Merit (R.M.) or Production Registry (P.R.). The rules governing these registries are very similar in the breeds and include the following:

1. Available only to registered purebreds not possessing any outstanding faults.
2. Litters must be ear-notched at farrowing.
3. Weaning weights of litters taken at 52 to 60 days with witnesses, and calculated to 56 day basis.
4. Litter weights of gilts under 15 months of age corrected by the factor 1.15.
5. To qualify, a sow must produce a certain number of pigs and reach a minimum litter weight.
6. Boars become R.M. or P.R. on 5 R.M. or P.R. daughters (with relationship stipulations).
7. Breed associations urge testing of whole herds of sows rather than a selected few.

Thus, in addition to pedigreeing, protecting and promoting, the swine record associations of America are now adding proving to the list of services rendered.

Progeny testing as now followed in this country is simple, and where it has been tried, the breeders are convinced of its merits. It merely involves marking the pigs in each litter, a practice followed by purebred breeders anyway, then weighing them at 8 weeks of age and recording the weights. If the pigs in a litter do not measure up to a certain standard, they and their parents are discarded from the breeding

herd. In a purebred herd, the pigs must also measure up to the standards of the breed. The criteria or "yardstick" is the total litter weight at weaning time for the reason that results show that, in most cases, the heaviest pigs at weaning time are also the heaviest at marketing time. Moreover, it must be recognized that one-third of all pigs farrowed are lost before weaning. Naturally, the larger ones have a greater chance of survival. One-hundred-eighty-day weights plus records of feed consumption would be desirable, but these are more difficult to obtain and not entirely necessary.

The great livestock shows throughout the land have served admirably in the improvement of breeding animals, but it must be recognized that such exhibitions have very definite limitations. The chief objective of the show ring is to inform breeders concerning correct types which, presumably, are associated with the most efficient production or performance. Unfortunately, such ideals have not always represented the most efficient animals, as evidenced by the extreme changes in the type of swine during the first part of the last decade. Furthermore, the show-ring is at best purely arbitrary, and the judge is forced to make many compromises in his own mind. Thus, modern hog breeders are demanding more than showing winnings. They are asking for concrete evidence of efficiency of production — size of litters farrowed, suckling ability of sows, and ability of the pigs to gain rapidly and economically.

The purpose of progeny testing is to emphasize practical utility points, and to enable breeders to coordinate outstanding individuality (type) with equally outstanding production ability. In addition to providing a basis for more intelligent selection of breeding stock, such production records will be invaluable from an advertising standpoint. Already there is nation-wide interest in this kind of program, and the public will soon be paying a premium for "production-tested" boars and gilts. Yes, this scientific approach to animal improvement is destined to become an intricate part of the livestock breeder's program.

Modern Version of "Johnny Appleseed"

Condensed from Dakota Farmer

Conrad M. Brown
Soil Conservation Service

THE folk-lore of American history hands down to us no legend more full of human interest than the story of Johnny Appleseed that benign character who left his monuments of apple trees scattered through the Ohio valley. But on the high plains of the "west river" country of South Dakota, apple trees play a minor role in the drama of human welfare in comparison to that played by grass. For on grass depends not only the immediate cash income of the citizens here, but also their entire mode of life. Without grass there literally can be no existence.

The recurrent droughts of the '30s, following the financial crash, forced abandonment of thousands of acres of submarginal land that had been broken by the plow and planted to wheat. And from these bare fields wind and water took a heavy toll of soil. The droughts and depression resulted in very heavy grazing use of the native range grasses, often weakening the grass to the point of destruction. To control erosion and return the lands to production, the abandoned fields were being sown to crested wheatgrass by the Soil Conservation Service, with good results. Some of the most depleted and more accessible range lands also were reseeded.

Down in eastern Perkins county, George Minges, president of the Grand River Grazing Association, watched all this activity thoughtfully. In some 30 years of ranching along these breaks of the Grand River valley, he had seen a lot of grass come and go. As he rode the range, he noticed a lot of small places where the grass was "thin," where weeds and thistles were in control, or where there was no grass. None of the places could justify the use of a grain drill to reseed them, for they were small and scattered. But he had seen times when even a few extra clumps of grass had made a big difference in checking soil erosion and in providing sorely needed feed. So, an idea entered his mind. From then on, whenever George Minges went riding, whether to check fences or water, or just to see that the cattle

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were getting along all right, he had a pocket or two full of crested wheat-grass seed. And when he saw a thistle clump, or an opening in the native grass cover, or even a bare portion of ground, he would drop a few seeds into it. Along the trails, in the cattle's stamping grounds, at the edges of the dams that had been built to store water, in fact, almost everywhere one goes over the range around the Minges ranch, there are scattered clumps of crested wheatgrass that have grown from seed that has been dropped as Mr. Minges rode. In addition, the Minges ranch, operating under agreement with the Soil Conservation Service as a demonstration ranch for soil conserving practices, has several big fields of crested wheatgrass which furnish reserves for hay for winter feeding and form good insurance against any future drought years.

"Crested wheatgrass should be planted at the right time," Mr. Minges said. "In the fall or early winter after some moisture is in the ground. There should be protective weeds or trash over the ground surface. A good place to plant seed is in an old Russian thistle stand. And don't be too disgusted if it doesn't show up much the first year—sometimes it takes until the second or third season to get a really good catch."

Mr. Minges speaks from experience, for while he has been fortunate in having good weather conditions and has secured good stands, he almost gave up a couple of times on one-year stands which looked very poor. But in the second and third years they turned out to be very good. Mr. Minges further observed:

"It will spread—just give it a chance. In that hay field of mine it didn't look like there were any seedlings at first, but it has really thickened up the last year or two—it does spread from seed. Of course, it won't kill out the native grasses, but where there is bare or disturbed soil, it will take over.

"As for its feeding value, it really makes very good hay if it is cut early enough. It should be cut before the full flower stage, and here in our part of the country that time is usually about the middle of June. After that it gets kind of wiry. And in the fall, it's the best feed there is to put calves on when they are weaned —keeps them going in great shape. Greens up nice for early spring use, too.

And after looking at the hay fields and the clumps of crested wheatgrass in all sorts of out-of-the-way little spots that formerly were barren, an observer has to agree that it has been worth the effort that this modern "Johnny Appleseeed" has put into it.

How to Train a Dog

Kenneth W. Adamson

Condensed from Pennsylvania Farmer

A few fundamentals are necessary in dog training before a dog can be taught to do or not do some particular thing. Unless you have full control over your dog at all times nothing can be accomplished.

The first step in breaking a dog is to teach him to come to heel immediately on being spoken to or signaled. The next step is to teach him to stay put at any particular spot and freeze there until given permission to move. A dog well schooled in these two first steps can be taught almost anything—without them he is worthless.

If your dog has been made a pet or has been played with by children, start by tying it up for several days during which time it should be fed only by the owner or handler. During this time do not allow it off the chain. For the "come-in" and "heel" lesson use 30 or 40 feet of light rope and a chain choke collar. As soon as the dog reaches the end of the rope give the command to come in, accompanying it by a sharp jerk and pull the line as hard and as fast as you can. Pet and fondle your dog as soon as it gets to you. Repeat, but carry no lesson over a half hour. I usually use a hand signal as well as the spoken word. In this case left arm forward, elbow crooked and palm of hand moved toward face. Along with coming to heel, walking at heel should be taught—about a mile fast walk, choke collar, very short leash kept taut, dog's head at your right knee.

To lie down or charge is the next and easiest lesson. If your dog is allowed in the house its favorite spot is a good place to begin. With the spoken command, press firmly on the back. If the dog braces or refuses, reach under the body, grasp off hind leg and upset by pulling to you. Walk away from it immediately with arm extended, palm down. The dog will probably get up as fast as you put it down, but repeat until it stays. When it does stay don't leave it too long. When ready, give it the word or signal to come in.

Some dog owners talk too much to their animal and the dog soon thinks the man is talking to himself. We cannot expect a dog to understand everything said to it, but it should learn

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early that the spoken word requires attention.

Assuming that your dog has mastered its primary work you are ready for the chickens. Without knowing you and your dog it is difficult to say whether the dog should be taken on leash or free into the chicken coop. If neither of you is the excitable kind I would prefer to take the dog in free. As soon as you both enter have the dog lie down. Leave it there until the chickens are all quiet. Proceed from it a dozen steps then bring it to you a step at a time. This first time in hen house is most critical. If you don't have full confidence in yourself and dog, have some other member of the family hold it on short leash, but otherwise have nothing to say or do with it. Make no move that will excite it and keep your voice down to normal pitch. Do not stay in hen house more than a few minutes.

If the dog breaks control and grabs a hen, throw your dog, hold it down with left leg, left hand firm grip on collar or skin of neck, beat it over the head with the chicken until the chicken is pretty well worn out. Punishment for a dog should be swift and certain. It must always be directly connected with the act, otherwise it is mere cruelty. Collies are very sensitive dogs and seldom need more than a harsh word, but this one time is the exception.

Right at this time you are going to completely ruin your dog or have the start of a good chicken herder. It might be well to have a cull chicken caught and handy so that no time is lost between her act and the punishment. Make it severe. When you are sure she has had enough make friends with her and don't let her get away from you until she has made friends with you. Next day and often afterwards take her with you when you gather eggs, feed, etc. Your first few times will be the hardest. If you have no mishaps then she well be good for life.

Watch Your Protein Step

Condensed from Capper's Farmer

A RECORD supply of protein feeds seems to be in prospect. Farmers are being urged to use liberally of them, first, to increase the supply of animal product foods, second, to get more efficient production and, third, to relieve congestion at vegetable-oil processing plants.

Before any feeder makes a radical change in protein concentrate rations, he'd better consult his state college animal and poultry husbandmen. In general, soybean oilmeal, which is receiving a big play in the recommendations, can replace linseed or cottonseed meals for beef cattle, dairy cattle and sheep, but farmers will logically consider price relationships. In case of poultry and hogs, replacement of animal source proteins should be made with extreme caution, despite recent assurances that such substitutions can be made freely. Vegetable proteins are deficient in minerals, vitamins and other nutritive elements in which animal proteins are rich.

W. E. Carroll, professor of swine husbandry at Illinois, found soybean oilmeal a satisfactory protein supplement for all classes of swine, both in dry lot and pasture, except possibly for young pigs fed in dry lot just after weaning. It proved entirely satisfactory for weaned pigs fed on pasture, when supplemented with calcium and common salt. He warns that whole beans make soft pork and that only meal which has been heated to cooking temperatures sometime during processing should be fed. For dry-lot feeding he recommends 1 part by weight of good-quality alfalfa meal should be given to 3 parts soybean oilmeal.

Said C. M. Vestal, Purdue University: "As supplies of tankage and meat and bone scraps become less adequate for feeding needs, and soybean oilmeal more plentiful and cheaper, hog feeders can cheapen their gains by using the straight soybean oilmeal with minerals as the supplement, especially for older fattening hogs. The large majority of good hog growers will feel that it is important to use some of the animal protein feed with soybean oilmeal in sow and pig rations.

"Where hogs are being pushed as rapidly as possible for market, as is the common practice in this state, we recommend Supplement C for hogs on pasture in summer, and Supplement 5 for those in dry lot where feeds are available

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for these mixtures." (Supplement C contains 20 per cent meat and bone scraps, 20 per cent menhaden fish meal, 40 per cent soybean oilmeal, 10 per cent cottonseed meal and 10 per cent linseed oilmeal. Supplement 5 calls for the same percentages of the same ingredients, except alfalfa-leaf meal is substituted for linseed oilmeal. While these supplements make extensive use of vegetable proteins, animal proteins comprise 40 per cent of the total.) "If cheaper gains are the main object," he continues, "then we would recommend soybean oilmeal with minerals. Half way between these extremes a mixture of soybean oilmeal and tankage or meat and bone scraps serves the purpose because of rapid and economical gains."

If tankage is available, J. S. Coffey, Ohio State professor of animal husbandry, believes it should comprise not less than 20 per cent of the hog supplement and suggests a formula containing 70 per cent soybean oilmeal, 20 per cent tankage and 10 per cent minerals.

At Iowa State College soybean oilmeal has been used as the lone supplement to pigs on pasture. But the meal, C. C. Culbertson, animal husbandryman, says "is too palatable to swine to be satisfactory when it is self-fed free-choice alongside of grain. Pigs ate more of the soybean oilmeal than they needed. Since it costs more than corn, this was not profitable." Consumption was reduced by adding minerals—a formula consisting of 93 per cent soybean oilmeal, common salt 1 per cent, ground raw limestone 4 per cent and special-steamed bonemeal 2 per cent.

"We would not use soybean oilmeal as a lone supplement for pigs in dry lot," said Professor Culbertson. "We would also want more tankage in a blend for young pigs (under 75 pounds) than for older pigs." When price relations favor soybean oilmeal, he suggests the following mixture for pigs under 75 pounds: Meat and bonemeal or tankage, 40 per cent; soybean oilmeal, 32 per cent; alfalfa meal, 25 per cent; mineral mixture, 3 per cent.

How much of the animal protein can be replaced with soybean oilmeal, he is not sure, but "Our guess is that pigs over 75 pounds would do all right on a blend in which half of the animal product was replaced with soybean oilmeal." A trial blend would be meat and bonemeal 20 per cent, soybean oilmeal 55 per cent, alfalfa meal 20 per cent and simple mineral mixture 5 per cent. C. G. Elling, Kansas State extension livestockman, suggests a mixture of equal parts tankage, linseed oilmeal, soybean oilmeal and alfalfa meal with minerals on the side.

Milton P. Jarnigan, Georgia station, suggests half the hog supplement be of animal source protein and half from vegetable, with cottonseed meal and peanut meal the most desirable for southern farmers. P. G. Bedenbaugh, Mississippi station, found peanut oilmeal satisfactory as the only protein supplement for pigs on good pasture, but in dry lot some animal source protein was desirable. Earl Hostetler, North Carolina, reports pigs fed peanut meal did not gain as rapidly, utilize feed as efficiently nor make as much profit as pigs fed fish meal. Should peanut meal get into northern feeding sections he suggests farmers determine whether it is made of whole nuts, including shells, or from shelled nuts. The whole nut product contains too much fiber. J. C. Grimes, Alabama station, recommends a ration of 1 part peanut meal to 5 parts corn. Higher proportions of the meal may result in soft pork.

George C. Herring, Virginia extension service, reports a conference in New Orleans last June concluded peanut oilmeal and soybean oilmeal can be used as the only protein supplement for fattening hogs, but refers also to a recent publication of the U. S. Extension Service which recommends a ration of corn, a 50-50 mixture of tankage and peanut meal, and mineral self-fed. Another ration is corn, equal parts of tankage, peanut meal and a cottonseed meal, and mineral, all self-fed.

On the poultry side, authorities are even more cautious about substitutions. To quote C. W. Carrick, Purdue professor of poultry husbandry: "Our experimental work over a good many years has shown that tabulated matter is not a safe guide in making substitutions. . . . For example, if you substitute so much meat scrap protein with soybean oilmeal protein, you haven't patched the fence at all," because of the mineral and vitamin deficiencies of soybean oilmeal. "In our experience with young chicks in confinement, it is evident that large amounts of soybean oilmeal as we have been using (over 30 per cent in some rations) do not supply the choline factor, in spite of all the publicity which soybean oilmeal has had as a supply of choline. Possibly processes affect this factor, but we are unable to say at present. Anyway, 5 per cent of meat scraps in the ration makes a whale of a difference in the growth results we get, and it is evident that for rations consisting of corn, soybean oilmeal, alfalfa and mineral corrections that 5 per cent of meat scraps in the chick ration does supply adequate choline, as well as some other factors. These statements . . . will serve to emphasize that protein is not the only thing to

keep in mind when making a substitution. There is ample evidence that soybean oilmeal is of high nutritional value, but so much of the work involving comparisons between animal products and soybean oilmeal and other vegetable proteins has been badly misinterpreted" as differences in protein quality, whereas in reality "our own experiences indicate the difference was largely in vitamin values, after mineral corrections are made." He also recommends manganese sulphate as economical insurance. An experimental ration containing only vegetable source proteins has given excellent results in egg production but poor hatchability. There is some opinion that an egg which won't hatch satisfactorily may not be top-quality human food.

Prof. H. J. Sloan's Minnesota experience records "very good results when soybean oilmeal comprises three-fourths of the total protein supplement if the difference in mineral was made up with bonemeal and if the ration was otherwise adequate in riboflavin. It would seem to me that it should not be necessary to go beyond this ratio unless the sources of animal protein turn out to be much shorter than we have reason to expect."

W. R. Whitfield, Iowa extension service, suggests a 26 per cent protein concentrate for hens, to be self-fed with shelled yellow corn and whole oats or wheat, in which 61 per cent of the concentrate protein is of vegetable origin. If a higher percentage is desired he thinks it might be built up to 70 per cent but does not recommend less than 25 per cent of animal protein.

Corn Meal as a Grass Silage Preservative

Condensed from Guernsey Breeders' Journal

G. Bohstedt, W. H. Peterson and G. P. Bahler
University of Wisconsin

MORE than twenty years ago, in several experiments, ground corn grain was used with fair success in the preparation of legume silage. Meanwhile, corn has become almost forgotten as a grass silage preservative. It has seemed that compared with a more readily fermentable carbohydrate like sugar or molasses, or compared with phosphoric acid or the A. I. V. acid mixture, ground corn was a less logical preservative. But recent tests at the Wisconsin Experiment Station have indicated that rather effective preservation may be obtained provided enough ground corn is added. It appears that a larger proportion of the starch of corn grain is converted to preservative acids than has heretofore been thought to be the case. If then, corn has at least fair preservative properties, a farmer with corn on hand at the time of grass silage harvest may save out-of-pocket cash that is necessary for buying molasses or acid.

The Wisconsin experiments conducted during the past three years have included corn meal-alfalfa silages put up in bottles, barrels, and as five to ten ton layers of silage in tower silos. Samples were analyzed for pH, carotene, and in a number of cases for NH_3-N. Where corn meal-alfalfa silage had been fed for a considerable time to milking cows, the milk was analyzed for carotene and vitamin A. The total vitamin A potency of the milk was found to be about equal to that of milk from molasses-alfalfa silage.

When less than 120 pounds ground corn was used for a ton of green alfalfa, the quality of the resulting silage as based on appearance, odor, and chemical analysis was only fair. Adding two pounds of sulphuric acid to the limited amounts of corn per ton of alfalfa gave much better preservation of carotene.

From 150 to 200 pounds ground corn as a preservative for alfalfa silage gave rather good results in all of the above aspects, and compared in its effect with sixty pounds of molasses. An outstanding effect of ground corn as a preservative was the improved palatability of such alfalfa silage as compared with alfalfa silage produced in various other ways. It is suggested that shelled corn or ear corn which is to be used as a preservative, be ground rather fine.

It Will Save the Lambs

Condensed from the Kansas Farmer

Electric pig brooders have been found so successful that electric lamb brooders are now being suggested. No perfect method of warming and drying the lamb has been developed, but case histories show that deaths at birth have been reduced as much as 97 per cent by immediately placing the lamb in a temperature-controlled brooder.

Lamb brooders are simple to make and need not be expensive. The materials often can be found on the farm. The brooder is merely a heated box. Heat is supplied either by an electric light bulb, radiant heater or a heating element. The addition of a thermostat guarantees that the brooder will always be at a constant temperature, protecting the lamb against chill or overheating.

A plan for one such brooder contains a thermostat heating element and fan for circulating the heat. The brooder is 48 by 28 by 28½ inches, has a hinged door on one side with a double glass panel, and is lighted with a 60-watt lamp. A partition is put in place in the end that contains the heating element and fan so the lamb cannot come in contact with the element. This partition has a 14- by 16-inch screen in it. The brooder has 6 to 8 lamb capacity and is inexpensive to operate. Total cost if everything is purchased would run around $25.

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Rental Rates for Machinery

Condensed from The Farmer

FARMERS who run into trouble getting repairs for old machinery next spring, or who can't get new machinery are likely to try to rent machinery. Since this situation will give rise to a great many questions about rental rates, members of the American Society of Agricultural Engineers have worked out a rate schedule.

The schedule covers only the use of the machine, *not the time of the operator.* The rates arrived at may have to be increased to cover severe operating conditions, and the engineers agree that if the lessee operates the machine rather than the owner or the owner's representative, there should be a considerable rate increase. This increase may reasonably be from 10% to 100% depending upon the owner's judgment of the lessee's skill in machine operation, and the care he is likely to give the machine.

Machine	Basic Rental Rate per Hour per $100 of New Cost: 1st 5 hrs.	After 1st 5 hrs.
Walking Plow*	$ .30	$ .15
Riding Plow*	.24	.12
Tractor Plow*	.28	.14
Lister Plow*	.28	.14
Disk Plow	.32	.16
Disc Harrow, Horse	.20	.10
Disc Harrow, Tractor	.22	.11
Field Cultivator*	.24	.12
Spring Tooth Harrow	.24	.12
Spike Tooth Harrow	.22	.11
Roller	.28	.14
Soil Pulverizer	.24	.12
Stalk Cutter*	.24	.12
Endgate Seeder	.52	.26
Grain Drill	.38	.19
Corn Planter	.40	.20
Rotary Hoe	.30	.15
Cultivator, Horse*	.20	.10
Cultivator, Tractor*	.20	.10
Mower, Horse*	.26	.13
Mower, Tractor*	.28	.14

Machine	Basic Rental Rate per Hour per $100 of New Cost: 1st 5 hrs.	After 1st 5 hrs.
Sulky Rake	$ .34	$ .17
Side Delivery Rake	.38	.19
Sweep Rake	.36	.18
Overshot Stacker	.34	.17
Hay Loader	.28	.14
Stationary Baler*	.13	.065
Pick-up Baler*	.17	.083
Peanut Picker	.26	.13
Grain Binder*	.42	.21
Thresher	.18	.09
Combine*	.24	.12
Corn Binder*	.42	.21
Silage Cutter*	.38	.19
Field Silage Harvester*	.40	.20
Silage Blower	.34	.17
Corn Picker	.28	.14
Husker-Shredder*	.20	.10
Manure Spreader	.11	.053
Wagon Gears and Box	.048	.024
Hay Rack	.07	.035
Tractor*	.08	.04

*Expense of sharpening shares, shovels, sweeps, sickles, cutting knives and cost of binder twine, baling wire, fuel and lubricant to be borne by lessee.

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FOR THE FARMER'S LIBRARY

These books are recommended as outstanding in their field:

Animal Sanitation and Disease Control—By Dr. R. R. Dykstra, Dean of the School of Veterinary Medicine, Kansas State College. The Interstate Printers and Publishers. $2.85.

Beef Cattle—By Roscoe R. Snapp, Asso. Prof. Animal Husbandry, Univ. of Illinois. John Wiley & Sons, Inc. $4.00.

Beef Cattle Production in the South—By D. W. Williams, Head, Department of Animal Husbandry, A. & M. College of Texas, College Station, Texas. The Interstate Printers & Publishers (1941). $2.00.

Beekeeping—By Everett Franklin Phillips, Professor of Apiculture, Cornell University. The Macmillan Co. $4.00.

Breeding Your Own, or Raising Colts for Pleasure and Profit—By Clarence E. Bosworth. The Derrydale Press ($10.00). A book suitable for the breeders of hunters' and saddle horses.

Dairy Cattle and Milk Production—By Clarence H. Eckles, B.S.A., D.Sc., late Chief, Div. of Dairy Husbandry, Univ. of Minnesota. The Macmillan Co. $3.90.

Dairy Science—By W. E. Petersen, Ph.D., Assoc. Prof. and Assoc. Dairy Husbandryman, Univ. of Minn. Edited by R. W. Gregory, J. B. Lippincott Company (1939). $4.00.

Farm Accounting—By Donald R. Mitchell, Asst. Prof. Agri. Economics, Univ. of Wisc. McGraw-Hill Book Co., Inc. (1941). $2.50.

Farm Shop Practice—By Mack M. Jones, M.S., Prof. Agri. Engineering, Univ. of Mo. McGraw-Hill Book Co., Inc. $2.75.

Feeds and Feeding—By F. B. Morrison, Prof. of Animal Husbandry and Animal Nutrition, Cornell Univ. Morrison Press. $5.00.

Farm Meats—By M. D. Helser, B.S.A., M.S., Prof. Animal Husbandry, Iowa State College. The Macmillan Co. $2.90.

Farm Management—By Robert R. Hudelson. The Macmillan Co. $2.00.

Farm Management and Marketing—By V. B. Hart, Ext. Professor of Farm Management; M. C. Bond, Ext. Professor of Marketing; L. C. Cunningham, Ext. Asso. Professor of Farm Management; all of N. Y. State College of Agriculture, Cornell University. Publishers: John Wiley & Sons, Inc. (1942). $2.75.

Forestry in Farm Management—By R. H. Westveld and Ralph H. Peck. John Wiley & Sons, Inc. (1941). $3.00.

Grow Your Own Fruit—By M. G. Kains, formerly with U. S. Dept. of Agriculture; Professor of Horticulture, Pennsylvania State College. Charles Scribner's Sons. $3.50.

Hunger Signs in Crops—Published by the American Society of Agronomy and The National Fertilizer Association. $2.50.

Home Vegetable Gardening—By Charles S. Nissley, Extension Horticulturist in Vegetable Growing. Rutgers Univ. Press (1942). $1.50.

Judging Dairy Cattle—By Edwin S. Harrison, Professor of Animal Husbandry, Cornell University. John Wiley and Sons, Inc. $2.75.

Livestock Judging Handbook—By Julius E. Nordby, Asst. Prof. Animal Husb., Univ. Idaho, and W. Malcolm Beeson, Ph.D., Asst. Prof. Animal Husb., Univ. Idaho. The Interstate Printers. $2.60.

Livestock Production—By Walter H. Peters, Chief of the Division of Animal and Poultry Husbandry, Univ. of Minn. McGraw-Hill Book Co., Inc. $3.50.

Poultry Husbandry—By Morley A. Jull, Prof. of Poultry Husbandry, Univ. of Maryland. McGraw-Hill Book Co., Inc. $4.00.

Poultry—By A. R. Winter, Asst. Prof. Poultry Husbandry, Ohio State Univ., and E. M. Funk, Asst. Prof. Poultry Husbandry, Mo. State Univ. J. B. Lippincott Co. $5.00.

Pork Production—By William W. Smith, Prof. of Animal Husbandry, Purdue Univ. The Macmillan Co. $3.75.

Practical Poultry Management—By James E. Rice, Emeritus Professor of Poultry Husbandry, and Harold E. Botsford, Extension Professor of Poultry Husbandry, both at New York State College of Agriculture. Fourth Edition (1940), John Wiley & Sons, Inc. $2.75.

Practical Horse Breeding and Training — By Jack Widmer. Charles Scribner's Sons (1942). $3.00.

Sheep Production—By Levi Jackson Horlacher, B.S.A., M.A., Asst. to Dean, Col. Ag. Univ. Ky. McGraw-Hill Book Co., Inc. $4.00.

Soil Conservation—By Hugh Hammond Bennett, Chief, Soil Conservation Service, U. S. Department of Agriculture. McGraw-Hill Book Company, Inc. $6.00.

Some Common Diseases of the Horse—By George R. Conn, B.S.A.H., D.V.M., Orange Judd Publishing Co., Inc. (1942). $1.50.

Some Common Diseases of Cattle—By George R. Conn, B.S.A.H., D.V.M. Orange Judd Publishing Co., Inc. (1942). $1.50.

Soybeans—Gold from the Soil—By Edward Jerome Dies. The Macmillan Co. $1.75.

The Western Horse—Its Training, Type and Marketing. By John A. Gorman, Asso. Prof. Animal Production, Univ. of Wyoming. The Interstate Printers and Publishers. $1.65.

The Farm Primer—By Walter Magnes Teller, formerly with the Farm Security Administration, U. S. D. A. David McKay Co. $2.50.

Vegetable Crops—By Homer C. Thompson, Ph.D., Prof. Veg. Crops, Cornell Univ. McGraw-Hill Book Co., Inc. $5.00.

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Farmers' Bulletin No. 1789, U. S. Department of Agriculture
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4. A stamped and self-addressed envelope must accompany the article if the author wishes to have the manuscript returned.
5. All articles must be received at the Editorial Offices of the Farmers Digest, Ambler, Pa., on or before June 1, 1943.
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Founded in 1903, **The World** unlike most breed magazines, is not published by the breed association but has always been privately owned. The present editor, M. S. Prescott, was a contributor to its columns as early as 1912 when he was still in college, became a part owner and editorial staff member in 1914 and since 1918 has been its editor. His brother, Wm. A. Prescott, and his son, W. T. Prescott, are associated with him on the editorial staff.

In its 26 issues of 1942, **Holstein-Friesian World** published 1,628 pages of Holstein lore including 850 Holstein pictures in addition to pictures appearing in the advertising. In its columns appear detailed reports of all the principal public sales of Holsteins and an important feature each year is the World summary of the auction sales of the preceding year. Most of the major Holstein shows are attended personally by members of the editorial staff and profusely illustrated reports of these shows are featured during the show season, culminating in the selection of the "All-American" sponsored by **The World** in which a committee of leading judges selects each year the best representative of the year in each of the age classes. This project was begun in 1922, and has been conducted annually to date.

Other features contributing to **World** popularity among its readers are reports of meetings of Holstein breeders, national, state and county, reports of great production records and other news of the industry. Many valuable features articles on breeding, feeding, herd health and herd management, disease control and eradication, etc., are contributed each year by leading authorities in these various fields. The editorial policy is constructive and fearless, devoted to the interests of the dairy industry in general; of the Holstein cow and her breeder in particular.

The World management has always contended that a breed publication cannot be edited satisfactorily from a swivel chair behind a desk, and the three members of the staff regularly travel upwards of 75,000 miles each year on Holstein business, attending sales, fairs and meetings all over the United States and Canada. Wherever Holstein folks gather in any considerable numbers, there you are apt to see one or more of the Prescotts, who claim to have a first name acquaintance with hundreds of Holstein breeders all over North America.

Holstein-Friesian World is published at Lacona, N. Y. The subscription price is $1.50 per year in the United States, $2.00 in Canada and $2.50 in other foreign countries.